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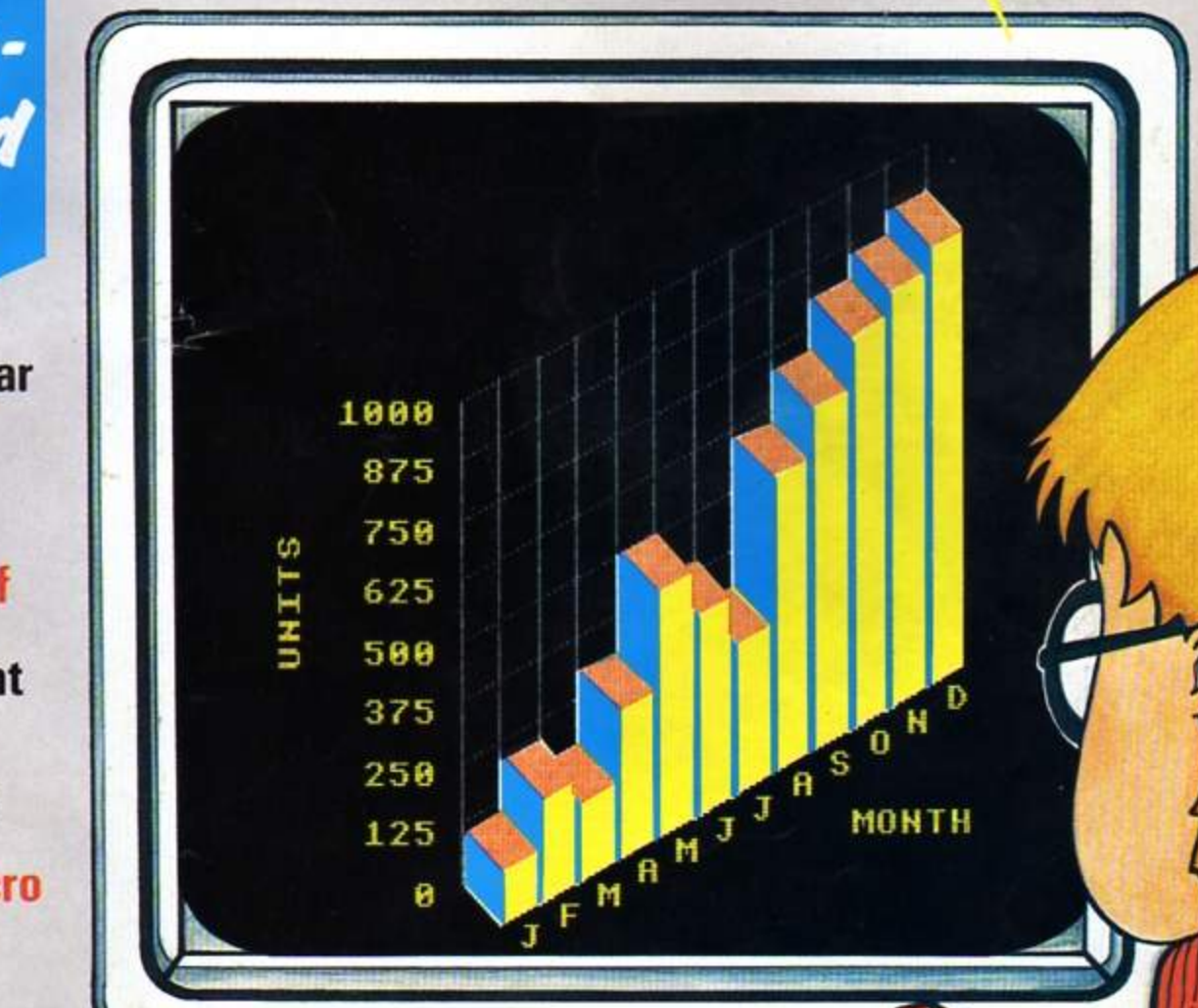

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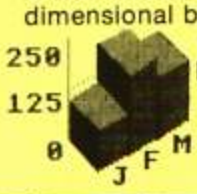

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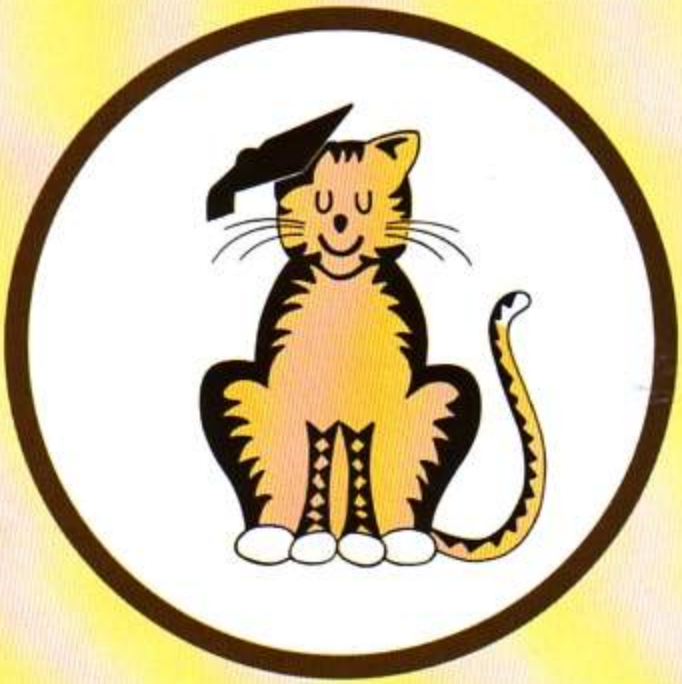

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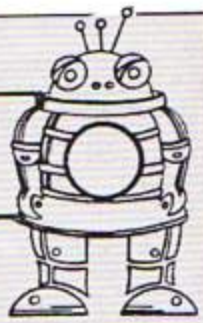

The price of piracy ...

ONE of the nice things about the Spring Electron & BBC Micro User Show in London was that I was able to meet lots of Electron users.

Of course I've got to know quite a few of you through the mail I get, but it's not the same as actually meeting people in the flesh and hearing first hand what you want from *Electron User*.

The questions I was asked about the Electron ranged from simple ones – that even I could answer – to amazingly difficult ones – which I directed to my colleagues on the technical advice stand.

I hadn't realised what a clever lot you are and how many of you cut your teeth on other micros.

The questions were fascinating and gave me lots of ideas for future issues of *Electron User*.

Among them all, though, one question stood out.

The questioner was a lady wearing an expensive-looking fur coat.

"How can you join two cassette recorders together?" she asked, sweetly.

"Using leads", I replied helpfully, "but I can't see why anyone would do that. Unless it was to copy software, which is illegal".

The lady smiled even more sweetly and adjusted the dead animal round her shoulders.

"But *everyone* does it", she protested, "I'm just having a few problems".

I told her to ask *everyone* and moved on to the next question, seething.

How would you feel if someone asked your advice on how to be a better housebreaker or a nimbler pick-pocket?

And how do you think our well-off lady would feel if I asked her if she did some shoplifting as well as ripping off software. No doubt she'd have been horrified.

"After all", she'd say, "copying tapes, ripping off software, it isn't stealing is it? Everyone does it".

The trouble is though, it is theft, and as companies whose products are regularly stolen try desperately to stay in business, it's putting up the price of software for everyone.

But then it's only the innocent who suffer, not the pirates who can afford fur coats. ***Pete Bibby***

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electron user NEWS

Expansion unit arrives – and it's official!

AT long last the first official Acorn hardware expansion unit for the Electron has been released.

Known as the Plus 1, and retailing at £59.90, it promises to take the Electron into the realm of serious computing expanding its capabilities, allowing it to use a printer, joysticks and solid-state program cartridges.

The matching unit is firmly attached to the back of the Electron by means of two screws and the overall size of the combination is about that of the BBC Micro.

It needs no external power supply, drawing its power from the Electron's edge connector.

Two proportional joysticks can be used via an 8 bit, four channel A-to-D converter. This will enhance both games and educational software.

In its more serious role the Plus 1 also enables the Electron to drive a Centronics type printer, allowing it to produce hard copy of listings and perform as a word processor.

Joystick and printer interfaces are already available from other manufacturers. The most original and exciting feature of the Plus 1 is that it has two slots that allow the use of software cartridges.

When the cartridges are slotted in the program is immediately available, sparing Electron users the long wait while the cassette tape loads.

The software will cover a wide range from games to educational programs, and from computer languages other than Basic to word processors.

Among the first six cartridge releases are four classic Acornsoft games – Snapper, Starship Command, Hopper and Countdown to Doom.

Educational software is represented by the Tree of Knowledge, while Lisp is available for those wishing to expand their range of languages.

The cartridge slots will also take hardware extension cartridges allowing further Electron expansion.

Acorn give the example of an RS423 serial interface for connection to serial printers, modems and other computers.

Further hardware extension cartridges are planned for the Plus 1, which Acorn sees as only the first in a series of Electron hardware expansion units.

Plug-in ROMs cut waiting

Telephone link on way

ELECTRON owners who feel that they have been left out of the computer communications revolution need worry no longer.

When Minor Miracles of Ipswich finish development work on their RS232 interface, the Electron will soon be able to talk to other micros and even mainframe computers.

Standard on the BBC Micro but lacking on the Electron, the RS232 port is the normal method of getting information out of one micro and into another – usually over telephone lines by way of a booster device or modem.

The interface will be used to link the modem directly into the Electron via the expansion bus.

...and printer interface

THE July Electron and BBC Micro User Show will see the launch of a new printer interface for the Electron. It will be released by First Byte Computers of Derby, manufacturers of the joystick interface.

They claim it will be the cheapest on the market.

The interface will not require additional software to make it operational and will allow all the normal printing control codes.

Micros answer to road deaths

A CALL has gone out to the ever increasing army of computer whizz kids to come up with an electronic answer to help keep death off the roads.

They are being invited to take part in a major contest to write the best computer program for the Electron or BBC Micro on the theme of road safety.

Open to all schoolchildren in the Greater London area, the new contest is being sponsored by the publishers of the *Electron User* and *The Micro User* magazines.

Posters and copies of the rules have already been sent out to more than 2,000 primary and secondary schools, with disc drives being offered as prizes.

Judging and awards will take place at the Electron and BBC Micro User Show, to be held at Alexandra Palace from July 19 to 22.

The Royal Society for the Prevention of Accidents and the Metropolitan Police are backing the contest and will be involved in selecting the most original programs.

"We feel that road safety schemes in the past have tended to talk down to children", says Mike Cowley, a spokesman for Database Publications, organisers of the contest.

"The Green Cross Code man and the squawking parrot are prime examples of the rather patronising approach of adults.

"Here then is an opportunity for children themselves to show what they can do by using their knowledge of the new technology to make a real impact on the road safety front".

Programs made easier

AMONG the flood of books that have been published for the Electron are three that should make life easier for those new to programming.

From Century Publishing comes "Very Basic Basic". Written by Derek Ellershaw and Peter Schofield, the book is designed to guide the new Electron user through the first few weeks of programming.

With a simple, non-technical approach, it is aimed specifically at those who find even the User Guide difficult.

Along the same lines, but with an added foray into the world of interfacing, is "An Introduction to Programming the Acorn Electron".

Written by R.A. and J.W. Penfold and published by Bernard Babani, the book takes a practical, step-by-step approach to learning Electron Basic.

The last of the trio is "Easy Programming for the Electron", published by Shiva. The author, Eric Deeson, already well known for his books about the BBC Micro, starts at basics and instructs the beginner in a lighthearted but informative manner in the intricacies of the micro.

More joystick links released

HOT on the heels of its first two hardware add-ons for the Electron, a new peripheral has been released by Sir Computers of Cardiff.

Demand for their Electron Printer/ADC Interface and the ROM/RAM Expansion Board has been so great the firm has been encouraged to add to its range of products.

The new peripheral is a combined Centronics printer and switched joystick interface. This differs from their previous joystick interface in that it allows the Electron to use two sets of switched joysticks.

Switched or Atari-style joysticks differ from the analogue-to-digital joysticks available on the previous interface. They are also more popular with games players.

"Basically we're doing what everyone else is doing", said Paul Kathro of Sir Computers, "but we're doing it properly".

The latest interface will hold its software in ROM, avoiding the need for a cassette tape to be loaded before the game is played. The ROM also contains a screen dump facility for Epson printers.

Sir claims that the new unit is compatible with every piece of Electron software available.

★ ★ ★

YET another joystick interface for the Electron is about to be launched as soon as sufficient quantities have been manufactured.

Produced by Wizard Development of Sheffield, it will allow two sets of switched joysticks to be used.

"Basically it's a little black box that sits on the back of the Electron and allows you to use two sets of switched, Atari-style joysticks", according to a Wizard spokesman.

Said to be capable of handling any commercial game that uses joysticks, the interface has its software built into the hardware. This obviates the need for cassette based software to be run before the game is loaded.

The company intends to enter the Electron software market soon.

Expansion bus 'no weak link'

AN Acorn spokesman has quashed rumours concerning the robustness or otherwise of the Electron's expansion bus.

"Absolute rubbish" was his firm response to being told of reports that the bus could not withstand more than 100 connections and disconnections of peripherals.

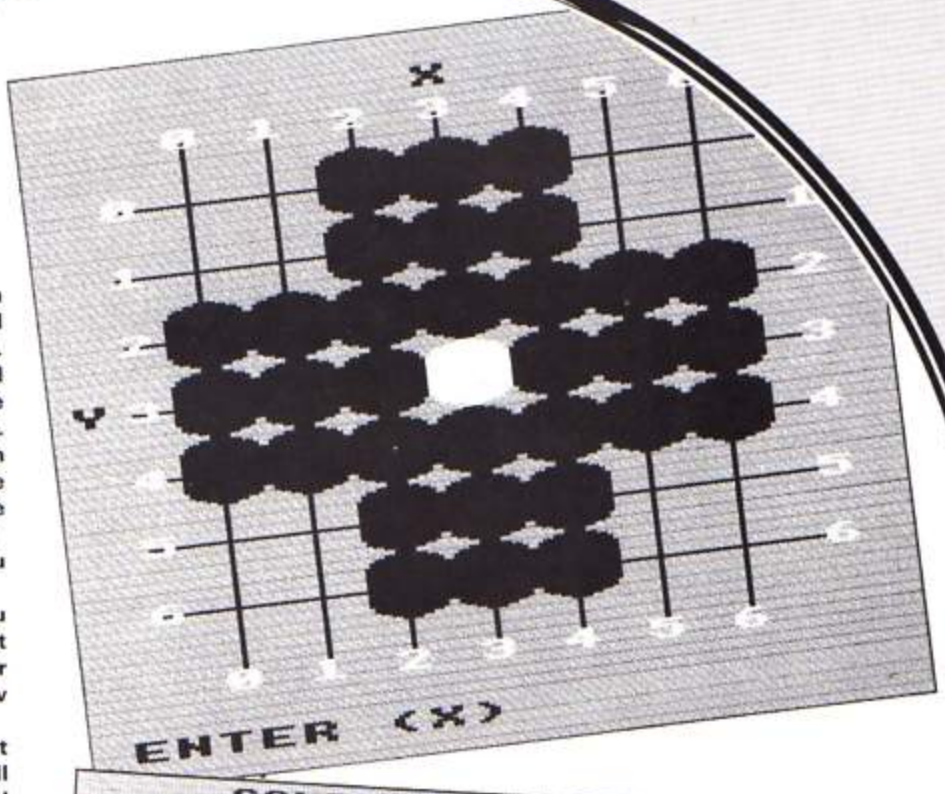
A strong and reliable part of the Electron, the bus was certainly hardier than the reports made out.

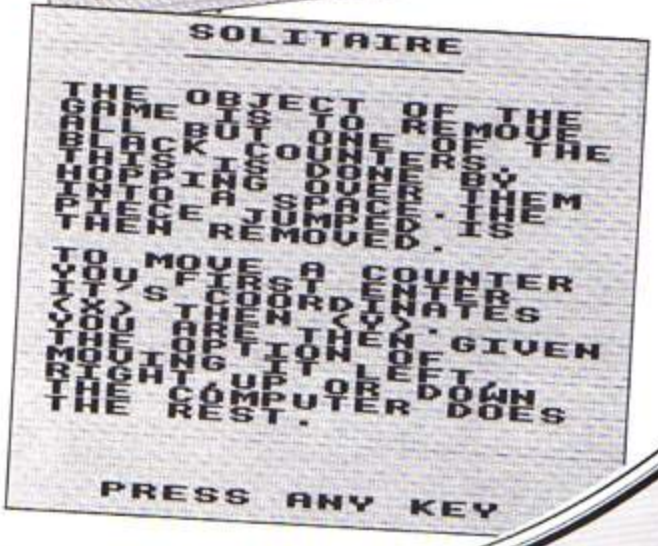
However, like any other electrical circuit, it has to be treated with respect.

But the Acorn spokesman pointed out that the bus wasn't designed specifically for peripherals that were continually being attached and then taken off.

The concept was that the official Acorn product would be fitted to the Electron and not removed, further expansion units "piggybacking" on it. This would avoid any wear and tear of the expansion bus, he said.

Go it alone





SOLITAIRE is the Electron version of the age-old game of logic and patience.

Run the program and your screen will display the solitaire board and its pegs. Just tell the Electron which peg you want to move – the instructions are in the game – and it will do it for you.

It will also tell you if you try an illegal move.

And if you decide you can't solve the puzzle, just press Escape and your micro will tell you how you've performed.

It's not hard to play but it is hard to solve. And you'll find it both amusing and addictive.

Electron Solitaire will still be testing your brain long after you've grown tired of blasting aliens.

Listing starts on Page 58

Take a break from zapping aliens with this time-honoured teaser from RUSSELL CARTWRIGHT

Part five of PETE BIBBY'S introduction to programming

And now FOR our NEXT trick ...

THE last article in this series left you with a program to run and try and understand. All it did was to ask you to enter 10 numbers and the Electron then printed out their total.

There was nothing particularly original in it, but there were two new key words, FOR and NEXT.

This month we'll be taking a closer look at FOR and NEXT and seeing how they work in combination to form what's known as a FOR . . . NEXT loop.

We'll be sampling just a part of the power released in our programs by using these FOR . . . NEXT loops and seeing how they work with the INPUT statement we talked about in the June issue of *Electron User*.

For the moment, however, let's have a look at how we would write a program which would ask for 10 numbers, add them up and give us their total.

This would do the same job as Program VIII last month. But as we don't know what they are yet we'll have to do it without the FOR . . . NEXT loops.

Program I shows how it's done.

It makes a total of 23 lines in all. Notice the use of meaningful variable names like *running_total* and *new_number*.

These are deliberately written in lower case letters to make them stand out and also to stop them clashing with Basic key words which are always in capitals.

```
10 REM PROGRAM I
20 LET running_total=0
30 INPUT "New number "new_
   number
40 LET running_total=runni
   ng_total+new_number
50 INPUT "New number "new_
   number
60 LET running_total=runni
   ng_total+new_number
70 INPUT "New number "new_
   number
80 LET running_total=runni
   ng_total+new_number
90 INPUT "New number "new_
   number
100 LET running_total=runni
   ng_total+new_number
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170 INPUT "New number "new_
   number
180 LET running_total=runni
   ng_total+new_number
190 INPUT "New number "new_
   number
200 LET running_total=runni
   ng_total+new_number
210 INPUT "New number "new_
   number
220 LET running_total=runni
   ng_total+new_number
230 PRINT "The total is
   ";running_total
```

Program I

Incidentally, that's not a hyphen in the variable names – punctuation marks aren't allowed. What looks like a hyphen is actually the underline mark which you'll find sharing the key with the downwards pointing arrow.

Take a look at Program I and see if you can spot a sort of common theme running through its lines.

You'll see that lines 30 and 40 and lines 50 and 60 are exactly the same, apart from their line numbers.

This isn't all that surprising when you consider they do the same things. Each pair of lines asks for a new number and then adds it to the running total.

In fact the same pair of lines, differing only in the line numbers, appear 10 times in the program.

I hope that you didn't type them all in separately but used the cursor keys and Copy to reproduce them easily.

You didn't? Well, you will next time.

Even so, having all those lines that are practically the same and do the same job must be a little inefficient, to say the least.

It would be nice if there were some way of just typing in the lines that do the work and telling the Electron to get on with it and obey them the required number of times.

Happily there is a way, in the form of a FOR . . . NEXT loop. This allows the Electron to perform the same lines over and over again a specified number of times. This is known as a loop.

The lines you want repeated come between the line with the FOR in it and the line with NEXT in it.

The FOR tells the Electron that it's come to the start of the lines that want repeating, the NEXT that it's come to the end of them. Figure I shows this diagramatically.

However, it's not quite that simple. We can't just use "a certain number of times" to tell the micro how often we want the enclosed lines to be repeated.

The Electron requires us to tell it how many repetitions we want in number form. This is so it can keep track of the number of loops by counting.

It's quite easy. All we do is set up a variable to keep track of things and tell the Electron the range that variable – the loop control variable, to be formal – will vary over.

Don't worry if that seems a bit odd. Just run Program II and it'll make sense.

```
10 REM PROGRAM II
20 FOR finger=1 TO 10
30 PRINT "Hello!"
40 NEXT finger
```

When the Electron obeys this program you get 10 "Hellos" on the screen. That's not too astounding – the interesting bit is the way it is done.

As you can see, line 30 is the one that PRINTs the message on the screen, and it does it not once, but 10 times.

This is because line 30 comes between the FOR of line 20 and the NEXT of line 40, which set up a loop that the micro performs over and over. But why 10 times?

The number of times that the Electron processes the loop is determined by the

control variable *finger*.

After the FOR of line 20 we have "finger=1 TO 10". This tells the Electron to set up the variable *finger* and give it an initial value of one. It is then to perform all the lines that follow until it comes to a NEXT.

When it finds the NEXT, which marks the end of the lines to be repeated, the micro adds one to the loop control variable *finger* and goes back to the beginning of the loop and does it all over again.

Each time that the set of lines inside the FOR and the NEXT is repeated the control variable *finger* has one added to it.

Eventually the control variable will reach the limit that's been set. This limit is the number that follows the TO in the line that starts the loop. In this case it is 10.

When *finger* equals 10, the Electron performs all the lines in the loop again – the tenth time.

It then comes to the NEXT which adds one to the value of *finger*. This is now 11, one

→

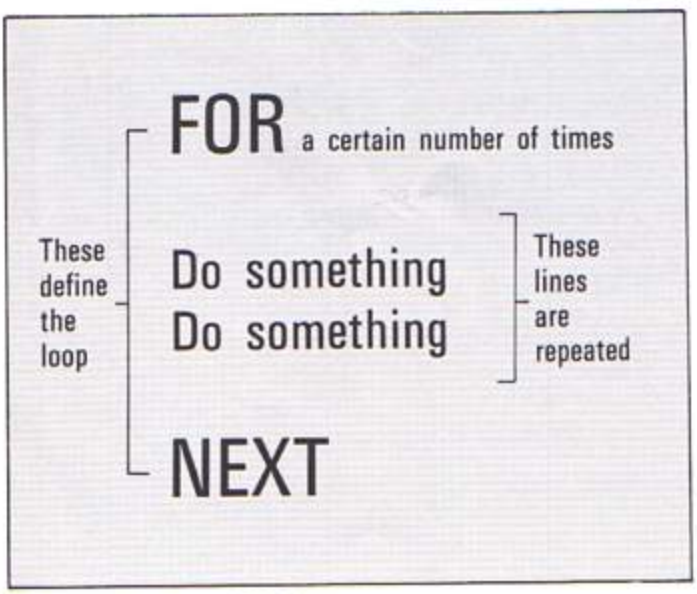

Figure I: A FOR . . . NEXT loop

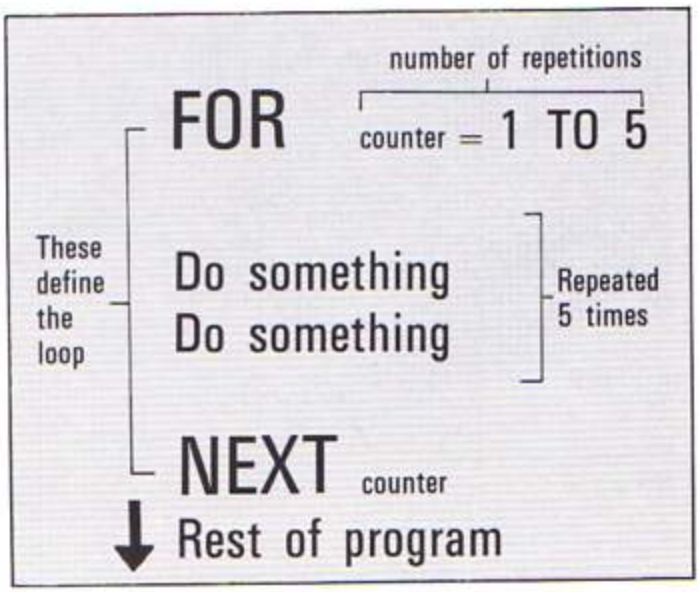

Figure II: Loop control variable

From Page 11

more than the upper limit of the control variable.

The Electron now stops going round the loop and carries on with the rest of the program – or would do if there were any more lines. This is shown in Figure II.

Really the Electron is just doing what we all do when we're repeating something several times. We count to keep track of where we are.

When our count reaches the number we wanted – the limit – we go off and do something else.

If you're as bad at maths as I am, you count on your fingers. Hence the name of the loop control variable in the previous program.

Before you run Program III, try and work out what it does and see if you're right.

```
10 REM PROGRAM III
20 FOR counter=1 TO 5
30 PRINT "Here we go again"
40 NEXT counter
```

What happens is that we get five "Here we go agains" on the screen. The loop is set up with the FOR in line 20.

This line also tells the Electron that it is to count from one to five using the control variable *counter*.

There's only one line between the FOR and the NEXT so that line 30 is repeated five times.

Each time round the loop, the loop variable *counter* is incremented by 1 and when it is over the limit – in this case 5 – the loop stops.

If you don't believe that the Electron increments the loop counter each time round, try adding a line like:

```
25 PRINT counter
```

to the program and you'll see it happening.

You'll have noticed that in both the previous programs the NEXT has been followed by the loop control variable. In the first case it was *finger*, in the second it was *counter*.

Strictly speaking you don't to have the loop control variable following the NEXT. The Electron doesn't need it there.

Having said that, I nearly always put it in as in long, complicated programs, while the Electron may not lose track of which variable controls which loop, I do.

Program IV shows the NEXT on its own. The loop control variable is called *loop* and as it goes from 1 to 3 the message appears three times.

```
10 REM PROGRAM IV
20 FOR loop=1 TO 3
30 PRINT "Not again!"
40 NEXT
```

The numbers that we give the FOR to control the loop don't have to be positive. Take a look at Program V:

```
10 REM PROGRAM V
20 FOR control=-1
   TO 2
30 PRINT "Yet again!"
40 NEXT control
```

Here the control variable, *control* ranges from minus one to two. As one is added to it each time round the loop, the message appears four times.

If you're puzzled as to why it's four messages and not three, remember that the control variable goes up by one each time round the loop.

This means that *control* will have the values –1, 0, 1 and 2. There are four values in all, hence the loop is performed four times and the four messages appear.

So, to recap, we've learnt the following five things about a FOR . . . NEXT loop:

- The lines that appear between a FOR and a NEXT are repeated over and over in what is known as a loop.
- The FOR marks the start of the loop. The lines that come after it are the ones that will be repeated.
- Also after the FOR comes the control variable and its range.
- The NEXT marks the end of the lines that are to be repeated and adds one to the control variable each time round the loop.
- The control variable keeps track of how many times the loop has been repeated.

One of the many powerful features of a FOR . . . NEXT loop is that we can use the control variable inside the lines that make up the loop as a kind of counter.

Program VI shows this happening:

```
10 REM PROGRAM VI
20 FOR number=1 TO 7
30 PRINT "This is pass
   number ";number
40 NEXT number
```

As you might expect by now, the program performs line 30 seven times. However the message each time is different.

This is because the last thing PRINTed by line 30 is the loop control variable *number*.

As this has increased by one each time round the loop – known as a pass – so the number at the end of the message changes. This can be a very useful programming tool.

Take a look at Program VII which displays the multiplication table for 10:

```
10 REM PROGRAM VII
20 FOR multiple=1
   TO 12
30 PRINT ;multiple;" times
   10 is ";multiple*10
40 NEXT multiple
```

Here the loop control variable *multiple* increases from 1 to 12 as the program goes round the loop. As *multiple* also appears in line 30, the line that is repeated by the loop, so the times table appears.

If you want to see how much work that simple use of a FOR . . . NEXT loop has saved you, try producing the 10 times table using only PRINT statements.

Program VIII shows a new aspect of FOR . . . NEXT loops, combining them with an INPUT statement.

```
10 REM PROGRAM VIII
20 INPUT "What times table
   do you want",table
30 FOR multiple=1
   TO 12
40 PRINT ;multiple;" times
   ";table;" is ";multipl
   e*table
50 NEXT multiple
```

It's more or less the same as the previous program, only the INPUT of line 20 allows you to choose whatever table you wish.

There are only five lines in this program, one of which does nothing, but as you'll realise if you run it a few times, it's very powerful indeed.

FOR . . . NEXT loops, combined with INPUT statements can be the basis of some very effective programming techniques.

And now we come to Program IX, the problem program left over from June. If you've followed the above, you should be able to understand it.

```
10 REM PROGRAM IX
15 REM JUNE'S PROGRAM VIII
20 total=0
30 FOR loop=1 TO 10
40 INPUT "Enter number"
   ,number
50 total=total+number
60 NEXT loop
70 PRINT "The total is ";
   total
```

It's a simple FOR . . . NEXT loop that repeats the lines inside it 10 times. These repeated lines just ask you to input a number, held in the variable *number*, and add it to a running total held in *total*.

After 10 passes through the loop, the program then goes on to print out *total*, which is the sum of the numbers you've put in.

Simple isn't it? Anyway, it's certainly a lot easier than Program I.

And now you know so much about loops, try your hand at the following two programs. In Program X, why is the final value of *loop* 6 and not 5?

```
10 REM PROGRAM X
20 FOR loop=1 TO 5
30 PRINT "Pass number
   ";loop
40 NEXT loop
50 PRINT "Final loop is
   ";loop
```

And what's happening in Program XI?

```
10 REM PROGRAM XI
20 FOR loop=5 TO 1
30 PRINT "Something's
   wrong here!"
40 NEXT loop
```

I leave it up to you to find out.

FIRST BYTE
ELECTRON JOYSTICK INTERFACE

ELECTRON JOYSTICK INTERFACE

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- Postern
- Phoenix
- Software Invasion
- MRM
- Beebug-soft

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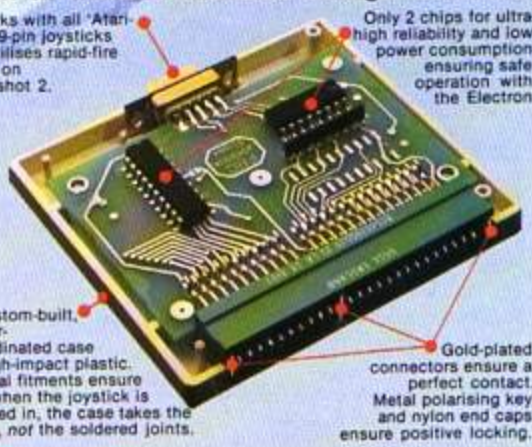
Look at these advanced design features.



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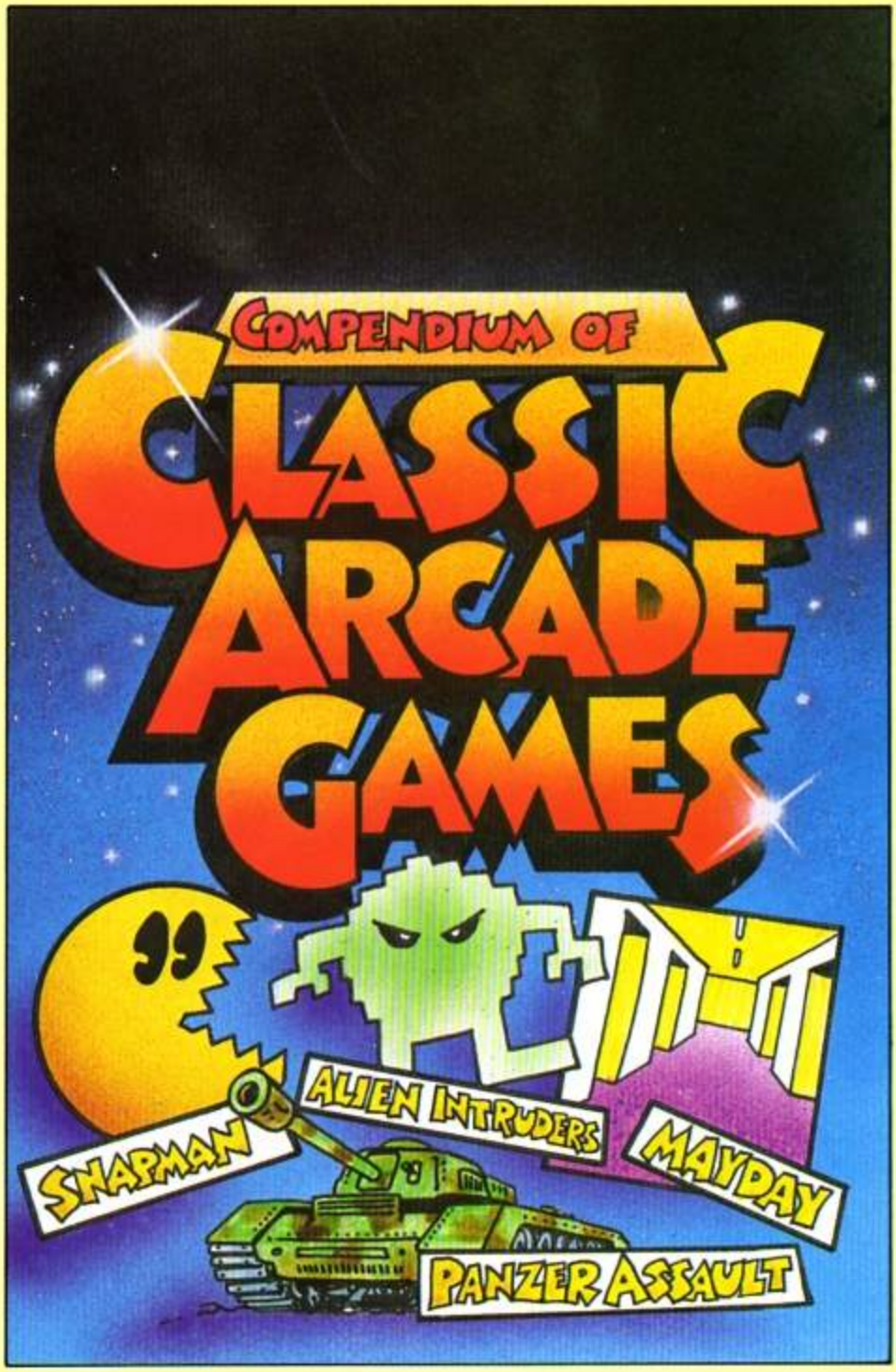

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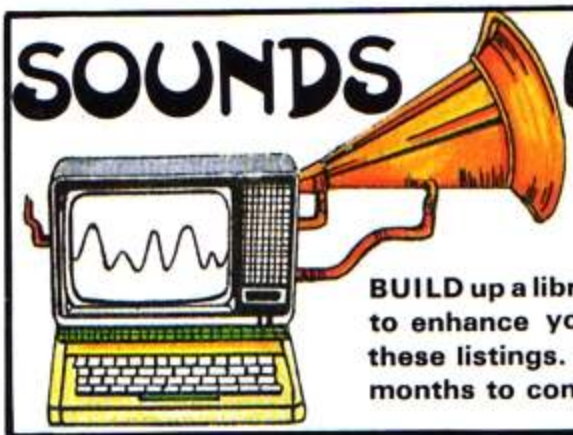

BUILD up a library of exciting sounds to enhance your own programs with these listings. And many more in the months to come!

DOG WHISTLE

From Richard Crees, Hungerford, Berks.

```
SOUND 1,255,-15,25
```

TOO MANY CHOCOLATES

From "Daniel in Yorkshire"

```
ENVELOPE 1,5,255,-255,
255,0,5,10,126,0,0,
-126,126,126
SOUND 1,1,100,100
```

ALIEN LASER

From J. Blakey, Heckington, Lincs.

```
10 ENVELOPE 5,1,10,-10,
10,2,1,5,126,0,0,
-126,126,126
20 SOUND 1,5,128,15
```

OVERLOAD

From N.J. Clarke, Dorchester, Dorset

```
ENVELOPE 3,3,-186,-255,-32,
-49,255,255,126,0,0,
-126,126,126
SOUND 1,3,3,255
```

AIR LEAK

From N.J. Clarke, Dorchester, Dorset

```
ENVELOPE 1,1,1,12,1,1,
17,11,126,0,0,
-126,126,126
SOUND 1,1,1,255
```

DIZZY DALEKS

From R. Traherne

```
10 FOR G=100 TO 165 STEP 3
20 FOR F=G+20 TO G STEP -1
30 SOUND &12,-15,F,1
40 SOUND &12,-15,F-5,1
50 SOUND &12,0,F-5,1
60 NEXT
70 NEXT
```

PERCUSSION

From N.J. Clarke, Dorchester, Dorset

```
10 FOR S=220 TO 0 STEP-10
20 SOUND 0,-15,S,5
30 NEXT S
```

Do you have any sounds for Sounds Exciting? Send them into Electron User and hear yourself in print. The address: Sounds Exciting, Electron User, Europa House, 68 Chester Road, Hazel Grove, Stockport SK7 5NY.

Notebook Part 6

TIMES TABLE is a simple but interesting program sent in by one of our readers, J.C. CURTIS. You just pick which table you want and what number you want to go up to and the Electron does the rest.

```
10 REM TIMETABLE
20 REM BY J.C.CURTIS
30 REM ELECTRON USER
40 MODE 6
50 PRINT '''* PLEASE ENTER
   THE TIMES TABLE REQUIRED
   *
60 INPUT A%
70 PRINT '''* PLEASE ENTER
   THE AMOUNT YOU WISH
   THE    TABLE TO GO UP
   TO*
80 INPUT B%
90 FOR C%=1 TO B%
100 D%=C%*A%
110 PRINT C%;" * ";A%;" =
    ";D%
120 NEXT
130 PRINT * PRESS SPACE
    TO CONTINUE*
140 REPEAT UNTIL INKEY (-99)
150 GOTO 10
```

REM's for humans

INPUT routines

FOR... NEXT loop

Calculates results

Prints out the answers

Delay until space bar pressed

Back to the beginning

10-30 The usual REM statements giving information to humans but not to the Electron.

40 Puts the Electron into Mode 6.

50 The message in inverted commas appears on the screen. The apostrophes make the Electron miss a line when it prints. This makes the display neater.

60 Allows the user to tell the Electron which table is required. This value is stored in the integer variable *A%*. The fact that an integer variable is used means that only whole numbers will be used for the tables.

70-80 These lines ask the user for the limit of the table and stores this in another integer variable, *B%*.

90-120 The FOR . . . NEXT loop which does all the work, printing out the table. At the beginning of the loop the counter *C%* is set to 1. Each time round the loop *C%* is increased by 1 and when *C%* equals *B%* (the limit chosen for the tables in line 80) the loop stops.

100 Works out the result of multiplying the times table number *(A%)* and the current value of *C%* each time round the loop. The answer is placed in the variable *D%*.

110 Prints out the result of the above calculation.

120 Sends the Electron back to line 90 if *C%* is less than the limit *B%*. When the two are equal the program goes straight onto the next line.

130 Prints the message in inverted commas.

140 The program just loops aimlessly, doing nothing, until the space bar is pressed. The Electron then goes on to the next line.

150 Sends the program right back to the beginning again.

Don't forget your times table manners

Trevor Roberts

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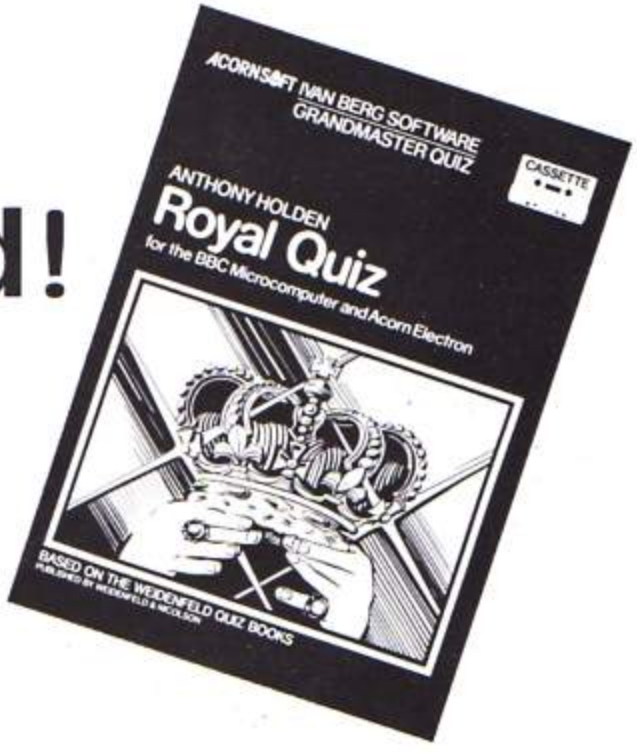


THERE are few subjects which crop up in conversation more than computers. But one that perhaps does appear just as regularly is royalty in all its forms – people have been fascinated by kings and queens for centuries.

Author Anthony Holden has collected a vast number of facts, both trivial and vital, about royal persons from earliest times to modern day.

These are presented as a series of 30 tests, grouped loosely by subjects as diverse as "The King's Musick" and "1066 and all that", and as intriguing as "The Bad..." and "Verse and Worse".

The difficulty of the questions varies a great deal, but I am sure very few people would score highly at first.

It is possible to answer individually or to have two teams competing. One drawback, of course, is that by loading the data from cassette it is accessed serially. This can be frustrating.

An introductory passage introduces each test, after which the question is posed. The author's answer is then shown so that marks may be awarded and entered.

This obviously is to prevent an answer such as "Duke of Edinburgh" being disallowed if the built-in answer was "Prince Philip".

I found this program quite fascinating, addictive and educational. It is also a welcome antidote to zapping aliens.

Phil Tayler

Adventure with a difference

Wheel of Fortune
Epic Software

THIS is yet another superb adventure from Epic but one with a difference. For it includes multiple statement commands and characters you can talk to!

One day you find a wheel with the words *Spin me and I'll tell you true, what the future holds for you* written on the hub.

When you spin the wheel you lose consciousness and, on awakening, glimpse a beggar disappearing into the distance with the wheel clutched under his arm.

You soon realise you are in a new and mysterious world. Your task is to recover the wheel and use it to return to your own world. Of course, on the way you collect as much

→

Creepy-crawly capers

Bugs
Virgin Games

JUST when you thought it was safe to go out onto the lawn and sunbathe, along comes Bugs from Virgin Games.

All is not well in the garden. You are being overrun by an army of marauding bugs.

All you have to repel them with is your trusty bug-blasting spray can, your fast reactions and quick wits.

The bugs start at the top of the screen, slowly working their way nearer and nearer to where you are at the bottom. Don't concentrate on them too much or you'll miss the spider that bounces along, just waiting to gobble you up.

You can jump upwards or sideways to avoid it, but it's a persistent little beast – always there when you least expect it.

And that's not all. Watch out for the harmless looking little snail crossing the screen. He may look sweet but that trail he's laying can stop you hitting the other bugs.

Also the scorpion that crosses the screen leaves a trail of deadly stings waiting just for you.

The instructions, both on screen and on the pack, are clear and simple, as is the keyboard layout. The sound is very good and the graphics are excellent.

Fast, funny and addictive, it's a very good game for the younger Electron buffs. That's if their parents will let them have a go.

Bev Friend

From Page 19

treasure as you can carry.

You start your quest above ground where you discover some of the novel features of this adventure.

The characters you meet move completely – well almost completely – independently of you or your actions. You find that you can talk to them and sometimes even get a helpful reply!

A useful keyword not usually found in adventures is CONTINUE, abbreviated to C. This moves you as far as is possible in a given direction or repeats a given action. For instance, E, C. means East, Continue.

I considered the adventure to be harder than previous ones from Epic, though this could be because of the added difficulty brought in by having to talk to the characters and to time your moves to coincide with theirs (hint!).

I shan't give too much away though making peace with the beggar is an absolute must if you want to progress.

I must confess I haven't managed to get very far myself. So if you get a fair way through it, or even finish it, please send me some clues!

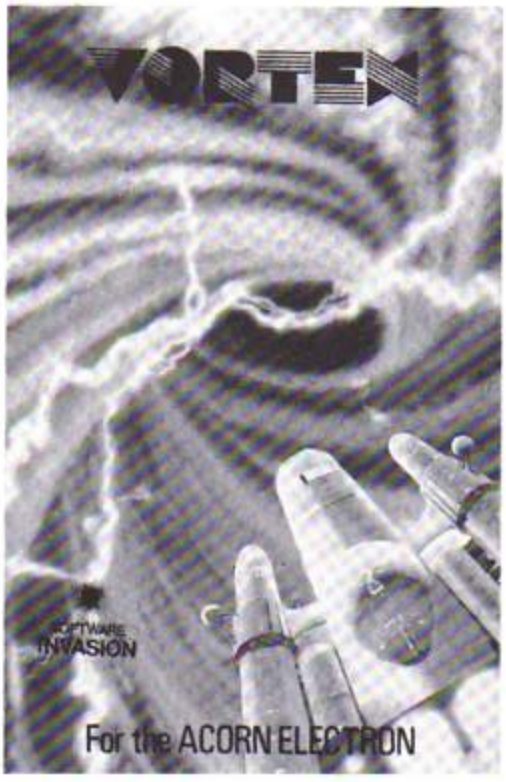
This is an exciting new adventure with some novel features. It's not for the novice but is excellent value for money for anyone else.

The definitive Electron adventure. Highly recommended.

Merlin

Voyage into the void

Vortex
Software Invasion



ONE of the good things about being a reviewer for *Electron User* is that you get to see and play a lot of the latest games.

The bad thing is that you have to take time off playing them in order to write the review!

It is particularly galling when the game is as good as Vortex, the new 3D space game from Software Invasion.

The program gives you command of five starfighters armed with the almost obligatory laser torpedoes.

Your mission is to enter the black void and hunt down the opposing aliens you find there. At the same time you're trying to survive and the trouble is that aliens aren't all you find in the void.

As you enter the vortex you are pulled forward faster and faster. The enemy craft come at you making you dodge and weave to avoid them.

When they're in range you can have a go at destroying them but they return the compliment, every hit lowering the strength of your shields.

Not that my shields ever ran out. By then I'd usually crashed into one of my attackers!

And when you've run that gauntlet you meet the real guardians of the vortex, the asteroids that hurtle towards you.

Your weapons are no use in these asteroid storms – your only chance is to dodge. The longer you survive, the further into the void you go and the faster the asteroids come at you.

And if you manage to survive them there are more aliens waiting to take you on at the other side.

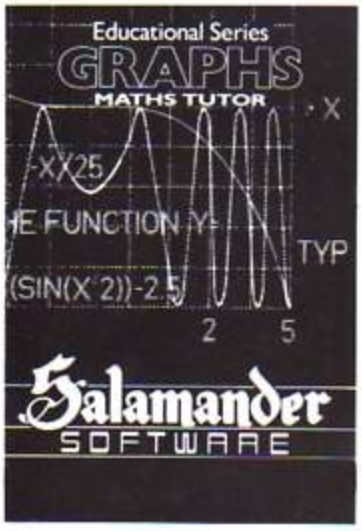
The speed has to be seen, or rather experienced, to be believed. You really do feel as though you are being drawn into the vortex, fighting for survival.

The graphics are excellent – though the sound could be better – and the instructions and keyboard use adequate.

A fast, captivating and amusing program, thoroughly recommended for lovers of action games.

Graham Parr

Plotting that learning curve



Graphs Maths Tutor
Salamander Software

WHEN I was studying O and A level maths there was only one way to produce a graph of a function. That was to mark sufficient points to elicit the shape of the curve.

It was painstaking work and often inaccurate owing to the unsteadiness of my hand.

Micros have now brought about virtual accuracy to this work, but plotting and labelling axes or marking out a grid remains very time-consuming.

This package, however, allows the function to be input, suitable axis limits to be applied and . . . there is your graph, perfectly drawn before your very eyes.

A quick plot feature is also available which uses preset values for the X and Y axes. This allows an approximation to be gained quite easily and quickly.

More advanced graphs make use of parametric expressions, with X and Y both being defined in terms of a third variable. This again is catered for, and the same range of options is available.

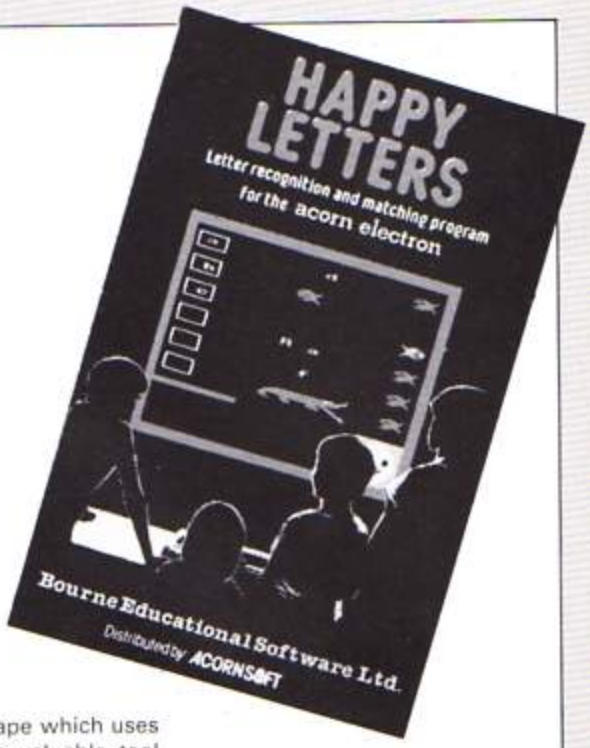
All through the most instructive booklet there is a rich variety of suggestions and questions which will quickly make the potential of this program easily understood.

The second part of the tape provides testing in the shapes of curves, with a multiple-choice format. This again covers an extensive range including trigonometrical functions, straight line curves and quadratic and cubic equations.

Any student from O level to post A level will find this suite of programs an ideal complement to both private study and revision.

Phil Tayler

Use your Electron as a valuable tool for teaching



Happy Letters
Bourne Educational Software

ONE of the points made by many infant teachers about the use of micros is that the keyboard is composed of capital letters, while infant children are more familiar with lower case.

This program has gone a long way towards solving this problem by showing the relationship between the two systems.

It contains a suite of five options which cover matching and identifying letters, with a delightful screen presentation which appealed greatly to the children I tried it on.

Five letters are displayed on one side of the screen, each with a fish lying behind it. Another letter moves slowly down the other side of the screen, pausing next to each of the five.

When the two match, and if the child correctly signifies this by pressing the Return key, the little fish swims across and collects the pair of letters. Then it smiles and swims back to its place.

When the sequence of attempts is over, a beautifully drawn crocodile appears at the bottom of the screen.

Those fish whose answers were correct can swim away, but wrong answers are gobbled up to shrieks of delight. The child making a wrong answer is given another chance, so hopefully most of the fish escape.

The first three options cover matching either lower case letters, lower case words or matching upper/lower cases.

The remaining two options provide necessary practice in finding the letters on the keyboard – a major stumbling block even with 10 or 11 year olds.

The time delay allowed by the program can be varied, so that the child can be tested against his previous results.

Monitoring the children's scores is done very well indeed. The adult can not only see the scores of each child, but also the incorrect responses made so that problems can be readily identified.

The program is a fine example of a tape which uses the micro as a valuable tool rather than merely as a gimmick.

Everything about the program seems to have been well thought out, from variable difficulty levels to an excellent 16 page booklet for parents.

Phil Tayler

IT'S FAST, FURIOUS AND COMPULSIVE!

Electron Invaders
Micro Power

IT'S amazing really. Only four years ago Space Invaders machines were the latest thing, original and compulsive.

I must have spent a fortune on them and still I never learnt how to get the mother ship without being hit myself.

Now, however, the alien invaders no longer hold sway. Newer and more colourful arcade games have taken over my affections.

Or at least they had until I had a go at Micro Power's Electron Invaders and learnt that the game was as fascinating as ever.

From the moment the familiar rows of aliens started descending from the top of the screen showering destruction I was hooked again.

At first they looked slow, but that was my mistake. They're as fast as ever and seem to be a lot more cunning.

In an effort to avoid destruction I spent a long time cowering under the three silos, but even that was no use as the invaders have a new weapon.

Not content with the usual rain of laser bolts they are dropping fragmentation bombs that can penetrate beneath your silo. This may not be cricket but it certainly adds a new dimension to the game.

The graphics are excellent, the sounds and instructions adequate and the game is as compulsive and frustrating as ever.

If you are an arcade game freak and you're looking for a version of invaders for your Electron then you need look no further.

But watch out for those motherships – they're deadly.

Peter Gray

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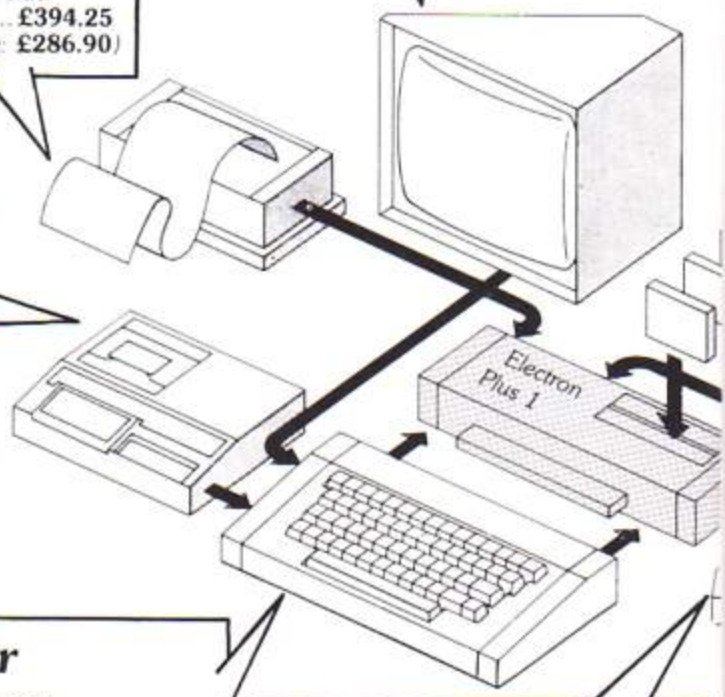

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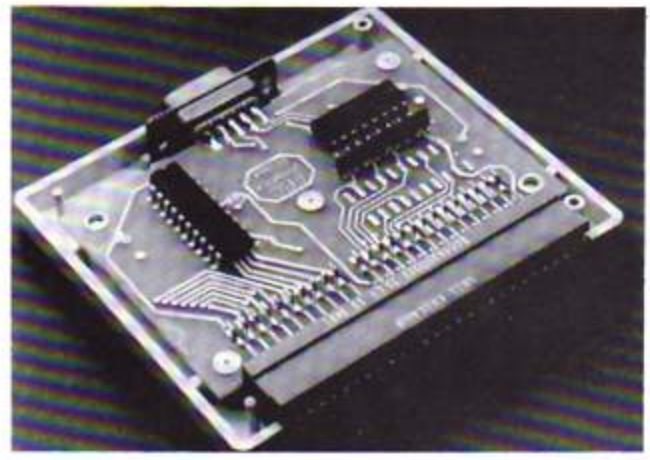
HARDWARE REVIEW



Go faster with a joystick

WHETHER you bought your Electron for games, graphics, education or just the joys of programming, the fact is a joystick is an invaluable addition to your system.

Once you've used one you'll never want to be without it again.

The trouble is that the basic, unexpanded Electron doesn't support joysticks, so you first need an interface.

First Byte's joystick interface is one of several that have recently come onto the market.

A small beige coloured box that matches the Electron, the interface slots neatly onto the rear edge connector at the back of the computer.

It lies flush with the work surface, rendering it very secure. Because it doesn't interfere with the normal keyboard operation of the computer, it can be left connected at all times.

The manufacturers claim that the casing is specifically designed to protect the expansion bus connector. I'll take their word for it, as I can't think of any way of testing it without destroying my Electron! Certainly it looks sturdy enough.

Like the Signpoint Interface reviewed last month, it uses "Atari-style" switched 9 pin joysticks.

With the hardware comes a cassette-based program which allows you to convert most commercial programs for use with joysticks, although it should be pointed out this isn't a permanent change to the game.

Enterprisingly, First Byte has managed to persuade most of the leading software houses to support the interface in its games software. This should mean few future compatibility problems.

The instructions supplied, although perhaps a little too brief, are well written and easy to understand, and tell you how to change your own masterpieces to joystick operation by means of the short program printed on the box.

Another advantage, although undocumented on the package, is that the Electron is able to read and respond to the joystick slightly faster than it is to the keyboard.

This has obvious advantages, especially for games programs.

A minor complaint is the positioning of the joystick socket on the far side of the unit.

This makes for some slight difficulty in inserting the joystick plug when the interface is in place, although the fact that such a minor point was noticeable says a lot for the overall satisfactory nature of the unit.

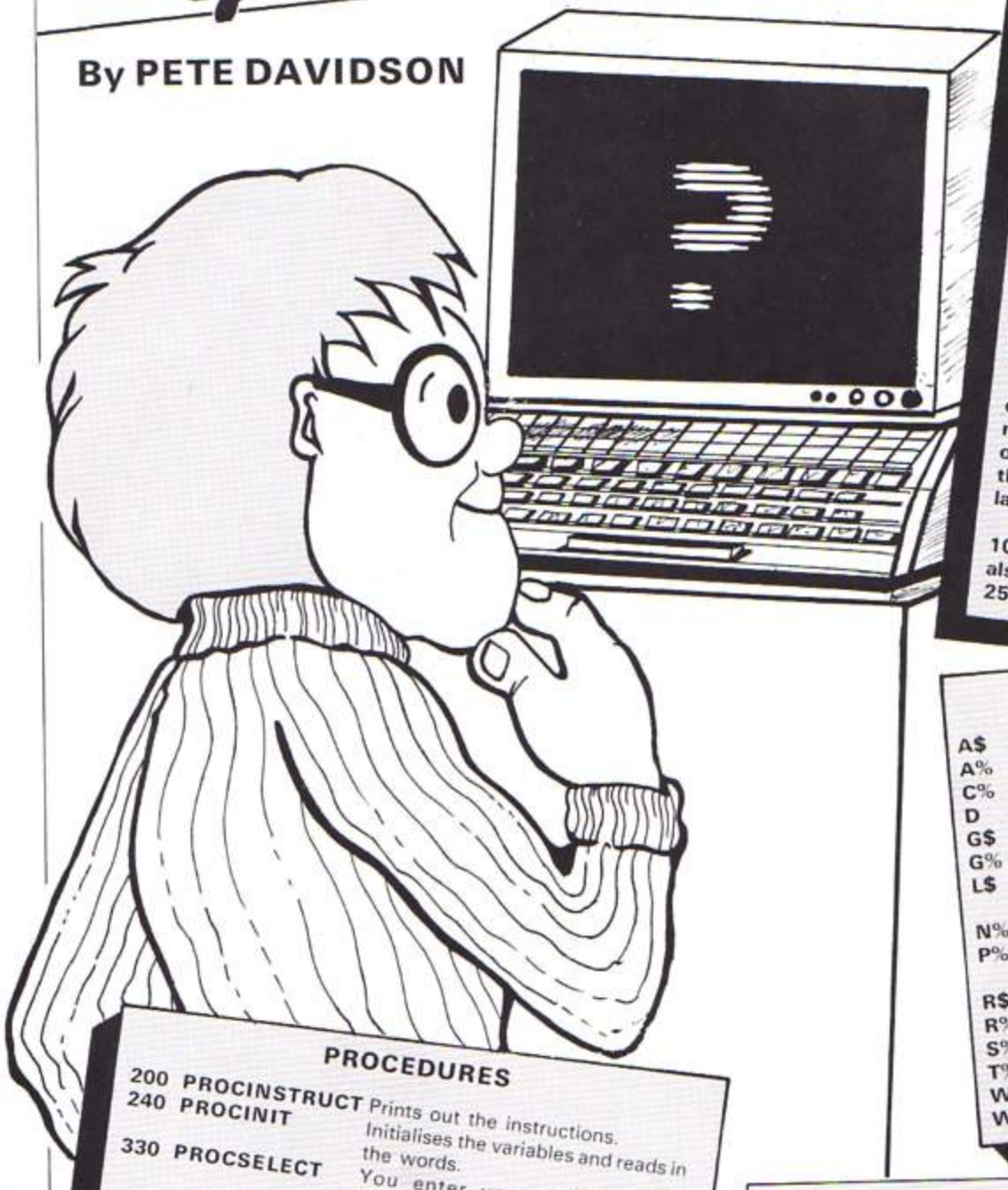
All in all, this is a splendid piece of equipment which I would not hesitate to recommend, despite the slightly high price of £25.

For your money you are getting a piece of hardware which is simple to use, easy to program, and which has endless possibilities beyond blasting aliens.

Andrew Oldham

GUESS THE WORD

By PETE DAVIDSON



IN Guess The Word, your Electron will think of a word and it's then up to you to guess what it is.

You start with a score of 10. If you have no idea what the word is, pressing Return will display another one of its letters, but loses you points.

You don't lose points for wrong guesses, but you do for guesses that are the wrong length.

You're not stuck with the words we give you. You can put your own in the DATA lines at the end of the program.

But remember that the computer will automatically take the first third of the list as easy, the next third as medium, and the last third as hard.

If you want more than 100 words total, you must also change the DIM in line 250.

VARIABLES

A$	Answer to questions
A%	Average score
C%	Choice
D	Dummy
G$	Your guess
G%	Number of tries
L$	Letter being given to you
N%	Number of words
P%	Position of letter in W$
R$	Letters remaining
R%	Running total score
S%	Score
T%	Tab position
W$(I%)	Array of words
W$	Selected word

PROCEDURES

200 PROCINSTRUCT	Prints out the instructions.
240 PROCINIT	Initialises the variables and reads in the words.
330 PROCSELECT	You enter your option (easy, medium, hard) and this procedure selects a word from the appropriate third of the data. It then prints the correct number of dashes on the screen.
430 PROCENTER	Takes in your guess of the word.
480 PROCLETTER	Selects a letter (if requested) and prints it in the appropriate position.
550 PROCCHECK	Checks your guess against the selected word.
610 PROCDISPLAY	Prints your score and average at the top of the screen.
650 PROCSCORE	Prints out the score details at the end of the game.

```
Select the level
that you require.

1...easy

2...medium

3...hard

Press 1, 2, or 3
```

Guess the Word listing

From Page 27

This listing was produced using a special formatter which breaks one program line over several lines of listing. When entering a line don't press Return until you come to the next line number. Full details of the formatter are given on Page 4 of the February issue.

```
 10 REM GUESS THE WORD
 20 REM (c) ELECTRON USER
 30 REM BY PETE DAVIDSON
 40 MODE 6
    :VDU 23,1;0;0;0;0
 50 PROCINSTRUCT
 60 MODE 2
    :VDU 23,1;0;0;0;0
 70 PROCINIT
 80 I%=0
    :S%=10
 90 REPEAT
100 PROCSELECT
110 REPEAT
120 PROCDISPLAY
130 PROCENTER
140 UNTIL G$=W$ OR
    LEN (R$)=0 OR S%=0
150 IF LEN (R$)=0 S%=0
160 PROCSCORE
170 COLOUR 5
    :PRINT '''"Do you want
     another"'"go?"
180 A$=GET$
    :IF A$="Y"
    THEN 80
    ELSE IF A$<>"N"
    THEN 180
190 END
200 DEF PROCINSTRUCT
210 CLS
    :PRINT 'SPC (12)"GUESS
     THE WORD"
211 PRINT ''" A word will
     be chosen at random
     by the"'"computer."''
    " You must try to guess
     the word and keepyour
     score as high as possi
    ble."
212 PRINT '" You start
     each go with 10 points
     and"'"lose points
     by asking to look
     at"'"letters or enteri
    ng words of the wrong"'
    "length. You do not
     lose points for"'
    "sensible guesses."
213 PRINT '" Bars across
     the top of the screen
     show your score and
     average score"
220 PRINT '''SPC (12)"PRESS
     ANY KEY"
    :D=GET
230 ENDPROC
240 DEF PROCINIT
250 DIM W$(200)
260 I%=0
    :A%=0
    :R%=0
    :G%=0
270 REPEAT
280 I%=I%+1
290 READ W$(I%)
300 UNTIL W$(I%)="EOF"
310 N%=I%-1
320 ENDPROC
330 DEF PROCSELECT
340 CLS
    :COLOUR 3
    :PRINT ''''"Select
     the level"'"that
     you require."
350 COLOUR 2
    :PRINT ''''"1...easy"'''
    "2...medium"''''"3...har
    d"
    :COLOUR 1
    :PRINT ''''"Press 1,
     2, or 3"
360 C%=GET -48
370 IF C%<1 OR C%>3
    THEN 360
380 W$=W$(RND(N%/3)+(C%-1)+
    N%/3)
390 R$=W$
400 T%=(18-LEN (W$))/2
410 CLS
    :COLOUR 4
    :PRINT TAB(T%,11)
    STRING$(LEN (W$),"-")
420 ENDPROC
430 DEF PROCENTER
440 COLOUR 5
    :PRINT TAB(0,19)"Type
     in the word and"''
    "press RETURN or just"'
    '"press RETURN to"''''
    "see another letter."
    TAB(T%,13);
450 COLOUR 6
    :INPUT ""G$
460 IF G$=""
    THEN PROCLETTER
    ELSE PROCCHECK
470 ENDPROC
480 DEF PROCLETTER
490 IF LEN (R$)=1 P%=1

    ELSE P%=RND(LEN (R$))
500 L$=MID$(R$,P%,1)
510 R$=LEFT$(R$,P%-1)+
    MID$(R$,P%+1)
520 S%=S%-2
530 COLOUR 2
    :PRINT TAB(T%+INSTR(W$
    ,L$)-1,9)L$
540 ENDPROC
550 DEF PROCCHECK
560 IF LEN (W$)<>LEN (G$)
    THEN COLOUR 3
    :PRINT TAB(0,19)"Don't
     be silly!"SPC (45)
    "The word is not "
    STR$ (LEN (G$))
    SPC (43)"letters long"
    SPC (100)
    :D=INKEY (100)
    :S%=S%-2
570 IF W$<>G$
    THEN COLOUR 2
    :PRINT TAB(0,19)"Wrong.
    ..............."''"Try
     again"SPC (140)
    :D=INKEY (200)
580 IF W$=G$
    THEN COLOUR 2
    :PRINT TAB(0,19)"CORREC
    T...WELL DONE!"
    SPC (180)
    :D=INKEY (200)
590 PRINT TAB(0,13)
    SPC (20)
600 ENDPROC
610 DEF PROCDISPLAY
620 COLOUR 3
    ;PRINT TAB(0,0)"SCORE
     "STR$ (S%)SPC (2)
    :COLOUR 131
    :PRINT SPC (S%);
    :COLOUR 128
    :PRINT SPC (20-S%)
630 COLOUR 1
    :PRINT "AVERAGE SCORE
     "STR$ (A%)SPC (2)
    :COLOUR 129
    :PRINT SPC (A%);
    :COLOUR 128
    :PRINT SPC (20-A%)
640 ENDPROC
650 DEF PROCSCORE
660 IF S%<0 S%=0
    ELSE R%=R%+S%
670 G%=G%+1
680 A%=R%/G%
690 CLS
    :COLOUR 6
    :PRINT TAB(3,8)"SCORE
     SUMMARY"
700 COLOUR 3
    :PRINT '''"YOU SCORED
     "STR$ (S%)
    :IF S%=0
    THEN COLOUR 5
    :PRINT '"IT WAS "W$
710 COLOUR 1
    :PRINT '"AN AVERAGE
     OF "STR$ (A%)
720 PRINT '"AFTER "
    STR$ (G%)" GO";
    :IF G%>1 PRINT "ES"
730 ENDPROC
1000 REM EASY WORDS
1010 DATA NEST,LEAF,ART
     ,THEY,SORT,LARK,SETT
     ,LAST,GOAL,APPLE
2000 REM MEDIUM WORDS
2010 DATA MEDIUM,HUMOUR
     ,PLASTIC,LAUNDRY,CRICKE
     T,SENTENCE,MINERAL
     ,COMMENCE,EMERGENCY
     ,TEMPER
3000 REM HARD WORDS
3010 DATA UNGUINOUS,LARYNGEA
     L,ZYMURGY,OLEASTER
     ,SEMIOLOGY,HYDROPSY
     ,BETATRON,PYRALIDID
     ,ONDOMETER,CRYOSCOPY
10000 DATA EOF
```

This listing is included in this month's cassette tape offer. See order form on Page 34.

If you miss Mode 7's ability to produce double height characters take a tip from W. JOHN WOOLLARD and . . .

LET YOUR TEXT WALK TALL

UNTIL the arrival of my Electron last November I was totally content with the Mode 7 of the school's BBC Micro for all my programs.

In my field of education – teaching less able pupils – my programs were mainly based on reading and comprehension skills.

Mode 7 offered enough graphics to make the programs visually appealing. It also offered double height characters – a most important factor.

Unfortunately Acorn did not think Mode 7 to be as important and treasured as did many of its users. So those of us with Electrons are forced to solve the problems of writing text to double height in other modes.

We needed an easy to use procedure called by PROCdblp(x,y,a$) where x and y represent the TAB positions of the string to be printed in double height, and a$ contains the string.

In Mode 7 the procedure was simply a single line as shown in Program I:

```
10 REM PROGRAM I
20 REM Double Height
30 MODE 7
40 PROCdblp(3,3,"Double
    Height Mode 7")
50 END
60 DEF PROCdblp(x,y,a$)
70 PRINT TAB(x,y)CHR$ 141a
   $TAB(x,y+1)CHR$ 141a$
80 ENDPROC
```

Program I

It's simple, but not available on the Electron.

The solution to printing in double height in the other modes is to print two characters, one above the other, which together form the complete letter/symbol.

Unfortunately in the text only modes, 3 and 6, there is a space between each line of text that cannot be used. Those lines are immediately apparent if one changes the background logic colour using a line such as:

```
10 MODE6:VDU19,128,4,0,0,0.
```

In those two modes double height characters are not possible without an annoying gap between the upper and lower halves. However this still leaves us modes 0, 1, 2, 4 and 5.

The next stage is to discover a quick method of creating a single character to represent the top of a letter and a single character to represent the lower half of a letter.

The solution is found on Page 240 of the Electron User Guide. The OSWORD call with *A%* set to 10 reads character definitions and returns them to memory locations determined by the values of *X%* and *Y%*.

All characters are represented by an 8 × 8 matrix of pixels. This matrix is in turn represented by 8 bytes of data, one for the top line, one for the next, and so on to the bottom line.

For example the letter "a" CHR$(97) is represented by 0,0,60,6,62,102,62,0. This should be familiar to anyone who has read Casting Agency in *Electron User*.

This works out as shown in Figure I:

Figure I

Any character can be redefined using VDU23. To define CHR$(255) so that it appears as a letter "a" you use:

```
VDU 23,255,0,0,60,
    6,62,102,62,0
```

where the final eight numbers are the matrix values starting at the top line.

Using OSWORD A%=10 and VDU23 together the following algorithm, of which Program II is the Basic version, was devised:

- Send the string to be printed.
- Take each character of the string in turn.
- Analyse the character matrix using OSWORD with A%=10.
- Set CHR$(255) to represent the top half and PRINT.

```
10 REM PROGRAM II
20 REM Double Height
30 MODE 1
40 PROCdblp(3,3,"ELECTRON
    USER")
50 END
60 DEF PROCdblp(x,y,a$)
70 LOCAL K
80 FOR K=1TO LEN (a$)
90 ?&70=ASC (MID$(a$
   ,K))
100 A%=10
110 X%=&70
120 Y%=0
130 CALL &FFF1
140 VDU 23,255,?&71,?&71
   ,?&72,?&72,?&73,?&73
   ,?&74,?&74
150 PRINT TAB(x+K,y)
   CHR$ 255
160 VDU 23,255,?&75,?&75
   ,?&76,?&76,?&77,?&77
   ,?&78,?&78
170 PRINT TAB(x+K,y+1)
   CHR$ 255
180 NEXT
190 ENDPROC
```

Program II

From Page 29

- Set CHR$(255) to represent the lower half and PRINT.
- Repeat for each character of the string.

Program II can then be reduced to VDU statements to save space, as shown in the listing for Program III.

Alternatively, to save variable space and speed things up, the *x* and *y* can be made into integers *x%* and *y%* or resident integers such as *M%* and *N%*. However this means that the procedure cannot be reduced below two lines.

Program IV is a machine code version which runs considerably faster. The string is analysed in a similar way but a CALL statement is used to analyse each character and PRINT it on the screen.

The CALLed machine code subroutine must be initialised at the start of the program.

That need not be the end of the story. The procedure can be developed to include error trapping and extended to include triple and quadruple height characters.

Now let all your text walk tall!

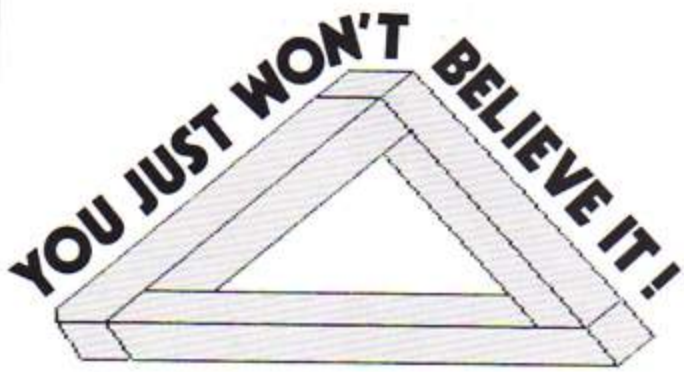
```
10 REM PROGRAM III
20 REM Double Height
30 MODE 1
40 PROCdblp(3,3,"Double
   Height")
50 END
60 DEF PROCdblp(x,y,a$)
70 LOCAL K
80 FOR K=1 TO LEN (a$)
90 ?&70=ASC (MID$(a$
   ,K))
100 A%=10
    :X%=&70
    :Y%=0
110 CALL &FFF1
120 VDU 23,255,?&71,?&71
    ,?&72,?&72,?&73,?&73
    ,?&74,?&74,31,x+K-1
    ,y,255,23,255,?&75
    ,?&75,?&76,?&76,?&77
    ,?&77,?&78,?&78,31
    ,x+K-1,y+1,255
130 NEXT
140 ENDPROC
```

Program III

```
10 REM PROGRAM IV
15 REM Double Height
20 MODE 1
30 PROCInit
40 PROCdblp(3,3,"MACHINE
   CODE")
50 END
60 DEF PROCInit
   :DIM dblp &FF
   :FOR Opt=0TO 2STEP 2
   :P%=dblp
   :[OPT Opt
   :STA&70
   :STX&79
   :STY&7A
   :LDA#10
   :LDX#&70
   :LDY#0
   :JSR&FFF1
80 LDA#23
   :JSR&FFEE
   :LDA#255
   :JSR&FFEE
   :LDA&71
   :JSR&FFEE
   :JSR&FFEE
   :LDA&72
   :JSR&FFEE
   :JSR&FFEE
   :LDA&73
   :JSR&FFEE
   :JSR&FFEE
   :LDA&74
   :JSR&FFEE
   :JSR&FFEE
   :LDA#31
   :JSR&FFEE
   :LDA&79
   :JSR&FFEE
   :LDA&7A
   :JSR&FFEE
90 LDA#23
   :JSR&FFEE
   :LDA#255
   :JSR&FFEE
   :LDA&75
   :JSR&FFEE
   :JSR&FFEE
   :LDA&76
   :JSR&FFEE
   :JSR&FFEE
   :LDA&77
   :JSR&FFEE
   :JSR&FFEE
   :LDA&78
   :JSR&FFEE
   :JSR&FFEE
   :LDA#31
   :JSR&FFEE
   :LDA&79
   :JSR&FFEE
   :LDA&7A
   :ADC#1
   :JSR&FFEE
   :LDA#255
   :JSR&FFEE
   :RTS
   :]
   :NEXT
   :ENDPROC

110 DEF PROCdblp(x,y,a$)
   :LOCAL K
   :FOR K=1TO LEN (a$)
   :A%=ASC (MID$(a$,K,1))
   :X%=x+K-1
   :Y%=y
   :CALL dblp
   :NEXT
   :ENDPROC
```

Program IV



THE Impossible Triangle from PHILLIP RASMUSSEN of Cardiff could have you not believing your eyes.

Using the techniques that Mike MacManus covers in this month's Graphics article, the program draws a seemingly impossible triangle.

No doubt this will be the start of a flood of Electron optical illusions!

```
 1 MODE 1
 2 VDU 19,3,3,0,0,0
 3 VDU 19,0,4,0,0,0
 4 VDU 23,1,0;0;0;0
 5 CLS
10 MOVE 360,780
20 DRAW 440,780
30 DRAW 400,740
40 DRAW 320,740
50 DRAW 360,780
60 MOVE 400,740
70 DRAW 660,400
80 DRAW 706,445
90 DRAW 440,780
100 MOVE 706,445
110 DRAW 745,390
120 DRAW 702,345
130 DRAW 660,400
140 DRAW 62,400
150 DRAW 400,740
160 MOVE 443,692
170 DRAW 196,450
180 MOVE 406,657
190 DRAW 600,400
200 MOVE 560,450
210 DRAW 115,450
220 MOVE 62,400
230 DRAW 98,345
240 DRAW 702,345
250 MOVE 320,740
260 DRAW -20,400
270 DRAW 62,400
280 MOVE 0,400
    :DRAW 0,417
290 MOVE 0,400
300 DRAW 35,347
310 DRAW 90,347
320 MOVE 0,1024
325 PRINT
330 PRINT "An Impossible
    Triangle"
340 REPEAT UNTIL FALSE
```

Classroom companions

Teacher PHIL TAYLER shows how the Electron is scoring top marks in the primary school

MORE than a year ago my school joined the hundreds of other primary schools who had already ordered a micro under the Department of Industry's Micros in Primary Schools scheme.

This gave a very limited choice, especially as the county suggested in the strongest terms that we should standardise on the BBC package.

We would have picked the BBC anyway, as it represented far better value for money than either the Research Machines micro or the Spectrum.

We waited (and waited) until the great day came and one of the staff went to collect the system.

The staff of 11 consisted of two with some experience of micros, and nine who had to be convinced that there was any place for the machine in their teaching.

We've had the system now for six months and the ratios have been exactly reversed.

Only two staff still hold reservations about their use of the micro, while the others vary from mildly to very enthusiastic.

This is obviously a very pleasing result, although it produces one major problem which must be repeated all over the country – one micro is almost worse than no micro at all.

It is constantly in such demand that another micro is urgently required. Yet we are not alone in being unable to find the cost of another identical system.

Perhaps the Electron can offer a totally feasible alternative, as I hope to show.

I had used my own micros in the classroom for a while, having previously owned a Spectrum and an Oric. I was fortunate to track down an Electron in early December, and was struck with the dearth of software around.

So I investigated the BBC software to see what would actually work on the Electron.

With the BBC Micro came a suite of programs from the Microelectronics Education Programme, all written in Basic and all listable.

The snags were obvious, as much use was made of Mode 7 and its CHR$ codes, but none was insurmountable.

Many merely call up colours of text or background, double height characters, etc, and this information can be gleaned easily from the BBC manual.

The average programmer can therefore modify the offending lines to produce an acceptable approximation or completely rewrite them.

One trickier problem is that Mode 7 supports all colours with 25 characters a line, while none of the Electron's modes offers an obvious equivalent.

The Electron has proved to be the ideal classroom companion for the BBC Micro

With all the programs converted where necessary we had two parallel systems which were very nearly equal.

Commercial software, however, has proved to be a rather different matter, especially where these are written in machine code.

There has been a welcome move recently towards more programs being made for the Electron or at least being made compatible with both the BBC and Electron.

It is to be hoped that compatibility will be maintained in the future, or perhaps software houses could produce versions for each micro, one on each side of the cassette.

How has the Electron fitted into my class, and others in the school?

Well, as can be seen from the accompanying photographs, it has proved most valuable.

We have, in Essex, a very positive view on the role of micros in primary schools. They should provide a stimulus to a child that the child cannot obtain in any better way.

This has led to a stimulating, open-ended approach to micros with young children, in which much use has been made of a cassette containing a subset of Logo.

Children can design their own patterns, shapes or figures and build them on screen, making any necessary modifications where appropriate.

Good programming habits were encouraged by the use of procedures, parameters and so on.

A snag from the children's point of view was the lack of colour facilities in the Logo tape, so after much thought, I let some of my more able pupils in on a little bit of Basic.

Having described the machine's graphics screen coordinates, I explained the MOVE and DRAW commands and their syntax.

When someone asked about a solid shape, I explained PLOT 85, and lastly the subject of graphical colours came up so I told them a little about GCOL.

The simple programs designed by the children showed flair and imagination.

There may be many teachers and others reading this whose hands are raised in horror at the prospect of primary children being given any information about Basic.

The truth is that many already know smatterings of Commodore or Sinclair Basic, so perhaps they should know what a well structured Basic looks like!

They were also given just enough information to complete a specific task. The level of discussion and enthusiasm was richly rewarding, and I feel the results more than justified the means.

With a bit of luck, one of the children will enquire about user-defined graphics and animation, which may well lead to another article for *Electron User*.

The Electron has proved itself to be a worthy complement to the BBC Micro, standing up to the robust treatment of five-to-eleven year olds with flying colours.

Its very similar keyboard has helped children to adapt, and the identical Basic has increased its application in the classroom.

Its smaller size has also been a useful feature, being much neater on the computer trolley.

If software firms only appreciate its immense potential, and write compatible programs, then the Electron will surely become the standard choice for a second micro in schools.

Tee-off for a day on the links, but be

FORE!...

FANCY a day on the links? You don't have to go further than your Electron with this version of Golf by ROLAND WADDILOVE.

See how many shots it takes you to get round the course. There are bunkers, lakes and lots of rough all waiting for you to tee off.

It's easy to play – all the instructions are in the game. You can go round the course by yourself or have up to four companions playing against you.

So type it in and drive off. But be prepared for a rough time if your game is under par.

PROCEDURES

PROCinitialise
Defines the characters used in the program, and the envelope used. Switches off the cursor keys, auto repeat and Escape. Redefines the Break key.

PROCinstructions
Prints the instructions and shows the characters used.

PROCset-variables
Turns off the cursor, defines a graphics window for the course and sets colours 9-13 to flashing black and white so the ball can be seen on any background. Inputs the number of players and sets up the arrays used.

PROCdraw-hole
Calls PROCcourse to colour the course green, PROCtrees to draw the trees and PROCfairway to draw the fairway which is made up of small yellow triangles. There is a 1 in 5 chance of calling PROClake to draw a lake. Prints the hole and the flag.

PROCplay-hole
Sets the start position( ) for all the players, that are not in the hole or in a hazard so hole( )=FALSE, in-hazard( )=FALSE. For each player PROCshot is called if not in the hole until all the players are in the hole.

PROCshot
Calls PROCinput-direction, PROC-input-distance, PROCcalculate-point to find where the ball lands and PROChit-ball to draw a line to the new position.

PROCinput-direction
Must be 1-8.

PROCinput-distance
If in-hazard( ) then the distance is random up to what you type in.

prepared for a rough time!

NEXT switch on for a game of golf

PROCcalculate-point	On direction% GOTO is used to select the correct calculation to work out the ball's new position.
PROChit-ball	Draws a line to the new position and calls PROCcheck-position to find out where the ball has landed.
PROCscores	Prints out each player's score.
PROCgame-over	Restores the auto repeat, cursor keys and Escape.

VARIABLES

players	Number of players.
holed( )	Stores whether a player has holed his ball or not.
shots( )	How many shots each player has made.
position( )	x,y coordinates of each player's position.
in-hazard( )	Stores whether a player is in a hazard or not.
hole	Number of hole.
n,i,j	Used in loops.
x%,y%,nx%,ny%	Temporary x,y coordinates of player's position.
direction%	Which way the ball is to be hit, 1-8
distance%	How far the ball is to be hit, 1-200
lost-ball	Whether a ball is lost or not.

IMPROVEMENTS/MODIFICATIONS

Alter the number of holes played, or add a new procedure PROCnumber-of-holes to ask how many holes you want to play.

Ask whether you want to play again when the game is over.

See whether you can print a flag next to each player's ball when it is his turn, to show where it is.

Golf listing

```
10 REM ** GOLF **
20 REM ** By R.A.Waddilove
   **
30
40 PROCinitialise
50 MODE 2
60 PROCinstructions
70 PROCset_variables
80 FOR hole=1 TO 9
90 PROCdraw_hole
100 PROCplay_hole
110 NEXT hole
120 PROCscores
130 PROCgame_over
140 END
150
160 DEF PROCdraw_hole
170 PROCcourse
180 PROCtrees
190 PROCfairway
200 PROCbunkers
210 IF RND(5)=5
    THEN PROClake
220 COLOUR 131
    : COLOUR 0
230 PRINT TAB(17,33-(j
    DIV 32));CHR$ 226;
240 COLOUR 1
250 PRINT CHR$ 224
260 COLOUR 7
    : COLOUR 128
270 PRINT TAB(7,0);"HOLE
    ";hole
280 SOUND 1,-15,100,10
290 ENDPROC
300
310 DEF PROCcourse
320 COLOUR 130
330 PRINT TAB(0,1);
    SPC (240);SPC (100)
340 ENDPROC
350
360 DEF PROCtrees
370 COLOUR 5
380 FOR i=1 TO 25
390 PRINT TAB(RND(19)
    ,1+RND(16));"*"
```

Turn to Page 55

Make light work of listings

To save your fingers most of the listings in *Electron User* have been put on tape. Seven are now available – for the February, March, April, May, June and July issues, plus a bumper tape of all the programs from the first four introductory issues.

On the July tape:

GOLF A day on the links with your Electron. **SOLITAIRE** The classic solo logic game. **TALL LETTERS** Large characters made simple. **BANK ACCOUNT** Keep track of your money. **CHARTIST** 3D graphs. **FORMULAE** Areas, volumes and angles. **NOTEBOOK** Time table.

On the June tape:

MONEY MAZE Avoid the ghosts to get the cash. **CODE BREAKER** A mastermind is needed to crack the code. **ALIEN** See little green men – the Electron way! **SETUP** Colour commands without tears. **CRYSTALS** Beautiful graphics. **LASER SHOOT OUT** An intergalactic shooting gallery. **SMILER** Have a nice day!

On the May tape:

RALLY DRIVER High speed car control. **SPACE PODS** More aliens to annihilate. **CODER** Secret messages made simple. **FRUIT MACHINE** Spin the wheels to win. **CHASER** Avoid your opponent to survive. **TIC-TAC-TOE** Electron noughts and crosses. **ELECTRON DRAUGHTSMAN** Create and save Electron masterpieces. **SHEEP** A program for insomniacs. **MATHS HIKE** Mental arithmetic. **MESSAGE** VDU commands in action.

On the April tape:

SPACEHIKE A hopping arcade classic. **FRIEZE** Electron wallpaper. **PELICAN** Cross roads safely. **CHESSTIMER** Clock your moves. **ASTEROID** Space is a minefield. **LIMERICK** Automatic rhymes. **ROMAN** Numbers in the ancient way. **BUNNYBLITZ** The Easter program. **DOGDUCK** The classic logic game.

On the March tape:

CHICKEN Let dangerous drivers test your nerve. **COFFEE** A tantalising word game from Down Under. **PARKY'S PERIL** Parky's lost in an invisible maze. **REACTION TIMER** How fast are you ? **BRAINTEASER** A puzzling program. **COUNTER** Mental arithmetic can be fun! **PAPER, SCISSORS, STONE** Out-guess your Electron. **CHARACTER GENERATOR** Create shapes with this utility. **FUNNY POLYGONS** Fast graphics going round in circles.

On the February tape:

NUMBER BALANCE Test your powers of mental arithmetic. **CALCULATOR** Make your Electron a calculator. **DOILIES** Multi-coloured patterns galore. **TOWERS OF HANOI** The age old puzzle. **LUNAR LANDER** Test your skill as an astronaut. **POSITRON INVADERS** A version of the old arcade favourite. **MOON RESCUE** Avoid the asteroids and save the spacemen.

On the introductory tape:

ANAGRAM Sort out the jumbled letters. **DOODLE** Multicoloured graphics. **EUROMAP** Test your geography. **KALEIDOSCOPE** Electron graphics run riot. **CAPITALS** New upper case letters. **ROCKET, WHEEL, CANDLE** Three fireworks programs. **BOMBER** Drop the bombs before you crash. **DUCK** Simple animation. **METEORS** Collisions in space. **COMBINATIONS** Crack the code. **BUZZ WORD GENERATOR** Let the Electron help you impress.

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Eleven programs from the April issue ..... £
Twelve programs from the March issue ..... £
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26 programs from the introductory issues ..... £ _____

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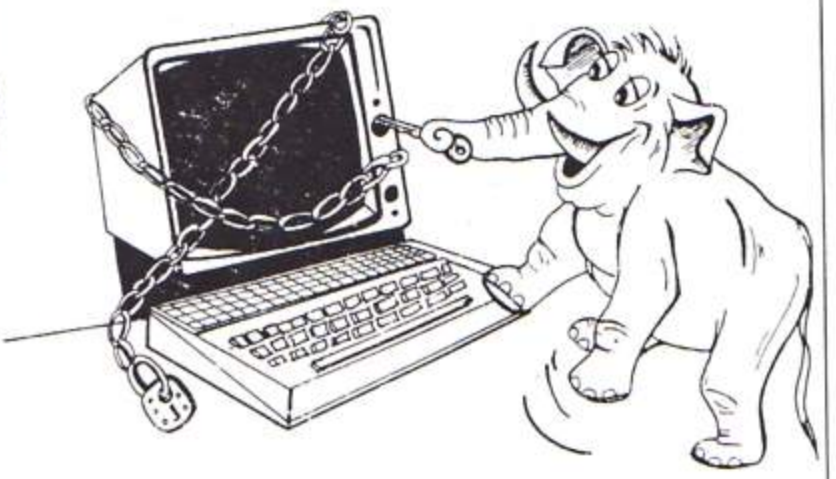
Graphics

UNLOCKING THE POWER OF THE GRAPHICS SCREEN



MIKE MACMANUS introduces that elusive little invisible beastie, the graphics cursor

ALTHOUGH it only seems like yesterday when I started, this is the fifth article on graphics I've written for *Electron User*.

This month we'll be looking at the graphics screen proper and learning how to use three new commands – CLG, MOVE and DRAW.

Before we get down to them, I'd like to just look back over the subjects covered in the earlier articles, a sort of *Story so far*...

The first article, on Page 28 of the February *Electron User*, discussed the seven modes available on the Electron.

We saw that there was a trade off between the number of characters and lines on the screen, the number of colours and the amount of memory used.

For example Mode 6, a two colour mode which has 40 lines of 25 characters each, only uses 8k of memory.

Mode 3, which is exactly the same apart from the fact each line has 80 characters, takes up 16k.

We then explored each of the modes and examined the way letters appeared in each one.

The article that appeared on Page 26 of the March issue took us into the world of computer colour.

We saw that each mode has what are known as default colours. These are the colours used when we enter that mode.

We also learnt how to use the COLOUR command with the logical colour numbers so we could have colours other than the default ones.

Modes 1 and 5 allow us four colours on the screen at once – one of them the background colour – while Mode 2 allow us an amazing 16 colours.

Of course the choice these modes allow is reflected in the amount of memory used. Mode 2 is very colourful but it does use a lot of memory – leaving less available for our program – and tends to slow things down markedly.

April was a bleak month for *Electron User* as there was no article from me. Still the situation improved in the May issue where, on Page 23, I held forth on actual colour numbers – which I called palette numbers – and the colourful VDU19 statement.

We learnt how you could get any of the 16 available colours from the Electron's palette in any mode. The only restriction was on the total number of colours on the screen at any one time.

Mode 6 would only allow us two colours at once, though by using a crafty VDU19 we could have any of the 16 available.

We also had a look at the way VDU19 can work backwards in time, by changing colours that are already on the screen.

And May was the month that the elephants appeared!

Page 19 of the June issue, along with an elephant, had us exploring VDU19 in more depth, showing how it could be used to brighten up text displays and even provide simple but effective animation.

As you can see, in just four articles we've come a long way and already your programs should be looking more colourful.

Now, however, I have a confession to make. Despite the fact that this is a series of articles allegedly about graphics, what we've covered so far isn't really graphics at all.

In fact all we've done is to talk about coloured letters and spaces.

What we've covered is

Graphics

From Page 35

what is known as the text screen – so called because it deals with the way letters and words are displayed.

In this article we start our exploration of the graphics screen and the commands that allow you to unlock its power.

For the time being we'll be content with saying that the graphics screen is exactly the same as the usual TV screen. We can, in fact, vary this but for now we'll just have the normal screen.

Where the graphics screen differs from the text screen we've used until now is the way it is divided up.

Take a look at Figure I. All it shows is the normal Electron TV screen.

Notice, however, the numbers by its side. They vary from 0 at the bottom left of the screen to 1023 at the top left and 1279 at the bottom right.

You can imagine the whole range of integers from 0 to 1023 and 0 to 1279 ranged along the sides of the screen.

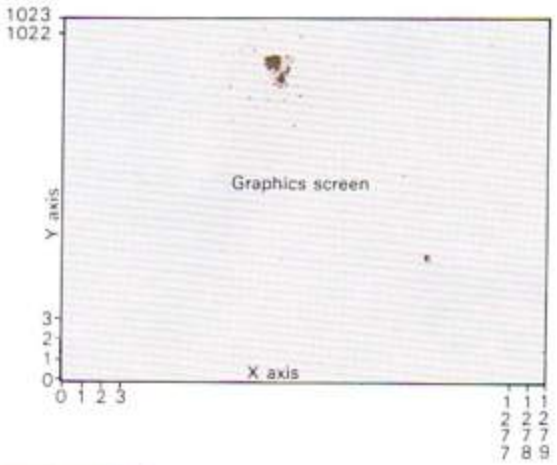


Figure I: Graphics screen coordinates

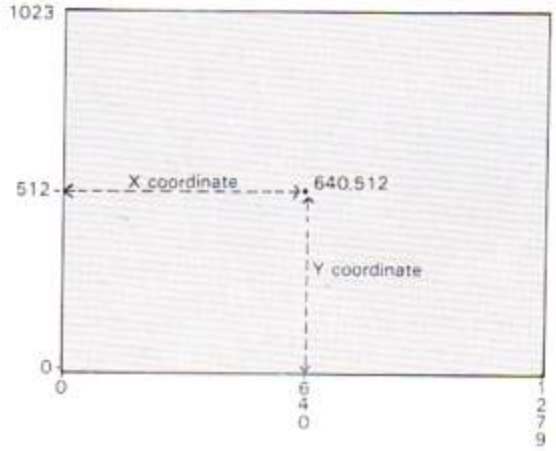


Figure II: Coordinates in action

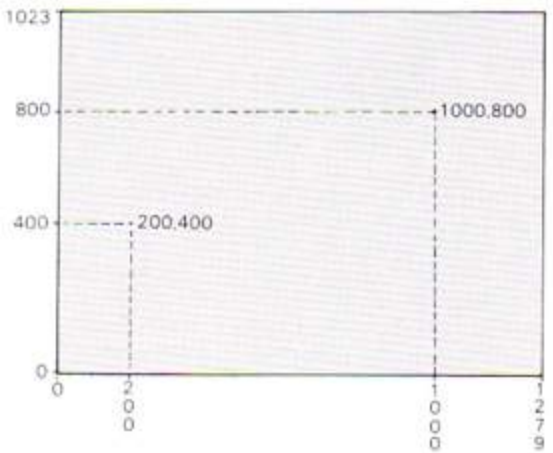


Figure III: More coordinates at work

These are what are known as the graphics coordinates. You can use them to accurately pinpoint a position anywhere on the screen.

Figure II shows a point which is roughly in the middle of the screen.

The graphics coordinates for this point are 640,512.

You find the point by going along the bottom of the screen – known as the X axis – until you come to the number 640. Then you go straight upwards until you get to the point that is level with position 512 on the Y axis – the one that goes upwards.

Figure III shows two more points along with their graphics coordinates. You'll notice that the coordinates that position a point are always shown in the form X,Y.

X is the distance the point lies along the X axis while Y, not surprisingly, is the distance along the Y axis.

Now we have a method of locating all the points on the screen what do we do with them?

The answer is we do graphics – and lots of them.

Using the coordinate system and the graphics screen we can unleash all of the Electron's colour graphics power.

However, we have to learn to walk before we can run, so let's start by learning how to draw straight lines.

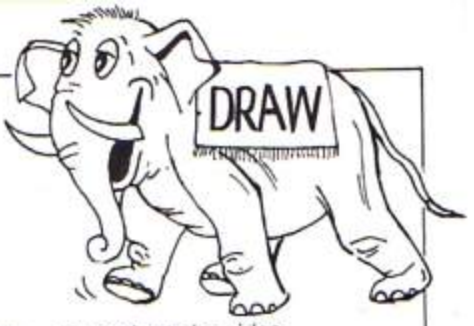
Unless things have changed a lot since I went to school a straight line is defined as the shortest distance between two points.

You get a straight line on an Electron by giving the micro the coordinates of the two points you want the straight line to join and telling it to get on with it.

The two commands that allow you to do this are the MOVE statement and the DRAW statement. These work on a strange little beastie called the graphics cursor.

We've come across a cursor before. It's that annoying flashing white line which shows where the next letter is going to appear on the screen.

This flashing cursor is the



text cursor, so called because it shows you where the text is going to appear in response to a PRINT or INPUT statement.

The graphics cursor is a different thing altogether. For a start you can't see it, you just have to imagine it.

Also it responds to the graphics commands such as DRAW. And finally it can be located at any one of the 1024 by 1280 locations on the graphics screen.

This makes it a much finer drawing instrument than the text cursor which is restricted to moving along lines and character spaces under the control of the TAB statement.

Don't worry too much about the difference between the two cursors. After a little practice it will become obvious.

I just think of it as the point of a coloured pencil resting on the screen.

Let's get on with drawing the straight line I promised. To do this we just put the Electron in one of the five graphics modes – 0, 1, 2, 4 or 5. Then enter:

```
DRAW 600,500
```

and press Return.

This results in a line from the bottom left of the screen to a point near the centre of the screen. This point lies 600 along the X axis and 500 up the Y axis.

But why does the line start at the bottom left of the screen, at the point defined as 0,0 in our coordinate system? Because of the way that DRAW works.

It tells the Electron to draw a line from the last set of coordinates that it used to the point whose coordinates follow the DRAW command.

In the case of:

```
DRAW 600,500
```

the Electron hadn't used a set of coordinates previously. In this case it just assumes the previous coordinates were 0,0 and DRAWs the line to 600,500.

Or you could say that the graphics cursor starts at 0,0 and the DRAW command moves it to 600,500, leaving a straight line on the way. Now you can see why I think of the graphics cursor as the tip of a pencil.

Now enter:

```
DRAW 800,700
```

and see what happens. Do you understand why?

What happened is that:

```
DRAW 800,700
```

has told the Electron to draw a straight line to 800,700 from the last point mentioned. This was 600,500, so the line joins the two points.

Have a go yourself, using DRAW to create straight lines on the screen. When you get fed up just use CLG to clear the screen.

No, not CLS – that clears the text screen. Use CLG which clears the graphics screen.

At the moment the two coincide so both work equally well, but CLG is the command that specifically erases graphics.

Don't worry if you don't follow that just yet. You will when we come to graphics windows.

You'll notice that so far all the lines we've drawn have been joined together – the last point of one line becomes the first point of the next.

This is all right for doodling but, as you'll find if you try to draw a picture, there are times when you don't want the lines to join up.

You want to give the DRAW command a new starting point. Can you do this?

The answer is that you can, using the MOVE command.

Suppose you have just started up your Electron and you wanted to draw a line from, say, 100,100 to 600,600.

Although you might expect:

```
DRAW 100,100
```

followed by:

```
DRAW 600,600
```

to do the job, it won't, as you get two lines.

The first, from screen coordinates 0,0 to 100,100, is the one that you don't want. The second, from 100,100 to 600,600, is the one you do want.

The Electron has taken the first point as 0,0 and worked from there. What's happened is that:

```
DRAW 100,100
```

tells it to join the point 100,100 to the previous point and hence the unwanted line.

What we should do is to move the graphics cursor to the point where we want the line to start. We do this using the MOVE command.

So, to get the line from 100,100 to 600,600 we just use:

```
MOVE 100,100
```

to move the graphics cursor to 100,100 without drawing a line. Then we just use:

```
DRAW 600,600
```

as normal to join 600,600 to the previous point – which we've set up with the MOVE.

Try it for yourself, combining DRAW and MOVE to put lines on the screen. After a few minutes you'll find drawing lines on the Electron becomes second nature.

Try writing a few programs using MOVE and DRAW. Program I shows how it's done.

```
10 REM PROGRAM I
20 MODE 1
30 MOVE 500,500
40 DRAW 800,800
50 DRAW 600,300
60 DRAW 500,500
```

All this does is draw a triangle on the screen. Line 30 MOVEs the graphics cursor to the starting point, the three DRAW commands producing the lines.

Program II goes on to draw

```
10 REM PROGRAM II
20 MODE 1
30 MOVE 400,800
40 DRAW 800,800
50 DRAW 800,400
60 DRAW 400,400
70 DRAW 400,800
```

a quadrilateral on the screen, using four DRAW commands to produce the sides.

Program III draws the same shape as Program II but puts the coordinates for the corners of the figure in the DATA statements of lines 80 and 90.

```
10 REM PROGRAM III
20 MODE 1
30 MOVE 400,800
40 REPEAT
50 READ X,Y
60 DRAW X,Y
70 UNTIL X=400 AND Y=800
80 DATA 800,800,800,400
90 DATA 400,400,400,800
```

While it doesn't save much time or memory space in this example, READing coordinates from DATA statements is the best way of producing complicated drawings.

And talking of drawings, let's end with Program IV which draws a ... well, I'll leave it for you to find out. They get everywhere, don't they!

```
10 REM PROGRAM IV
20 MODE 1
30 MOVE 450,200
40 REPEAT
50 READ X,Y
60 DRAW X,Y
70 UNTIL X=450 AND Y=350
80 DATA 400,200,300,300
90 DATA 200,200,150,100
100 DATA 100,100,150,250
110 DATA 250,400,400,550
120 DATA 500,450,575,475
130 DATA 575,250,450,350
140 PRINTTAB(11,19)"*"
150 VDU 23,1,0;0;0;0;
160 REPEAT UNTIL FALSE
```

And that's it for this month. Next time we'll be moving on to drawing coloured lines and graphics windows.

In the meantime I'll leave you with a couple of questions.

Why do the same lines, drawn with the same coordinates, look different in the different graphics modes?

And suppose we give a DRAW command a coordinate such as 1400,1400. As you'll see from Figure I, this is outside the graphics screen. What happens?

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E.H.T.	Minimum 19.5kv Maximum 22.5kv	Minimum 19.5kv Maximum 22.5kv
VIDEO BAND WIDTH	10MHz	6MHz
DISPLAY	80 characters by 25 lines	80 characters by 25 lines
SLOT PITCH	0.41mm	0.63mm
INPUT VIDEO	R.G.B. Analogue/ TTL Input	R.G.B. Analogue/ TTL Input
SYNC	Separate Sync on R.G.B. Positive or Negative	Separate Sync on R.G.B. Positive or Negative
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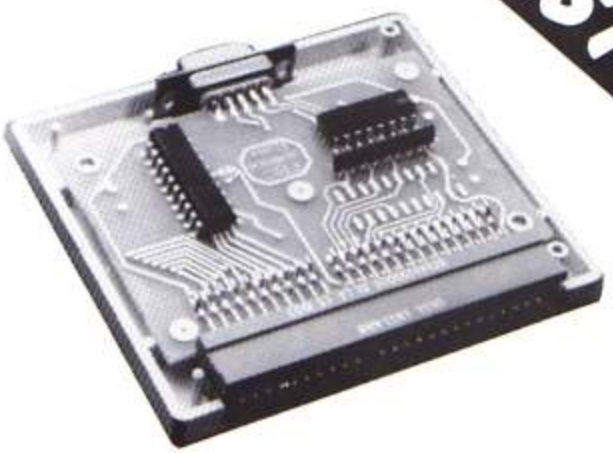
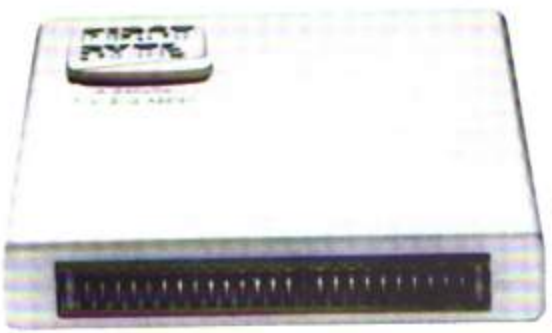
ELECTRON USER
FREE CONTEST

Plot away to WIN a joystick interface





TIRED of using your Electron's keyboard to play games? Worried about the effect all your pounding is having on your poor little micro?

Well why not have a go at our free competition? You could win yourself a high quality joystick interface from First Byte Computers.

We're giving away two of them, and the contest couldn't be simpler to enter.

Take a look at the Mike MacManus graphics article in this month's issue and see how he uses the Electron to draw a picture of an elephant.

All you have to do is use the same technique to create your own Electron masterpiece.

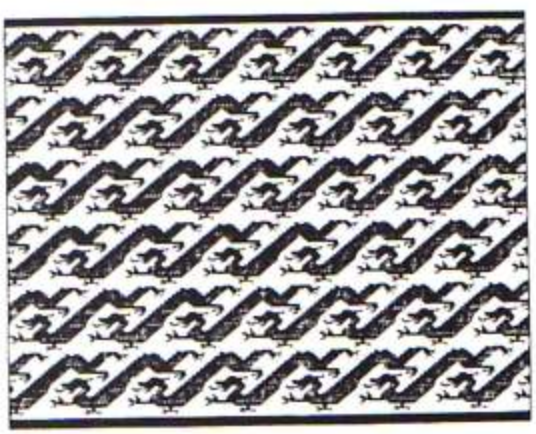
The catch is that you're only allowed to use up to 20 sets of coordinates in the DATA statements, so you'll have to be clever as well as artistic.

When you think you've got a winning picture, write down the coordinates of its points on the coupon below, and send us a sketch of your Electron drawing.

Remember, you can only use 20 points, one after the other.

Entries have to be received by July 31 1984 and the judge's decision will be final.

The two most original, artistic and amusing entries will win the First Byte interfaces.



Dragons grab April prize

REMEMBER in the April issue we asked you to design a frieze using Allen Plume's Frieze program?

The response was fantastic and the decision far from easy. You're a very talented lot!

Eventually we decided on the winner and a SIR Computers printer/ADC interface is on its way to Byrnice Reeds of Washington, Tyne and Wear for her dragons design, which we reproduce on the left.

Electron User contest entry form

Write down your picture's coordinates here:

1.	2.	3.	4.
5.	6.	7.	8.
9.	10.	11.	12.
13.	14.	15.	16.
17.	18.	19.	20.

Don't forget to attach your diagram!

Name _____

Address _____

_____

Send your entry to Drawing, Electron User Contest, Europa House, 68 Chester Road, Hazel Grove, Stockport SK7 5NY, to reach us not later than July 31, 1984.

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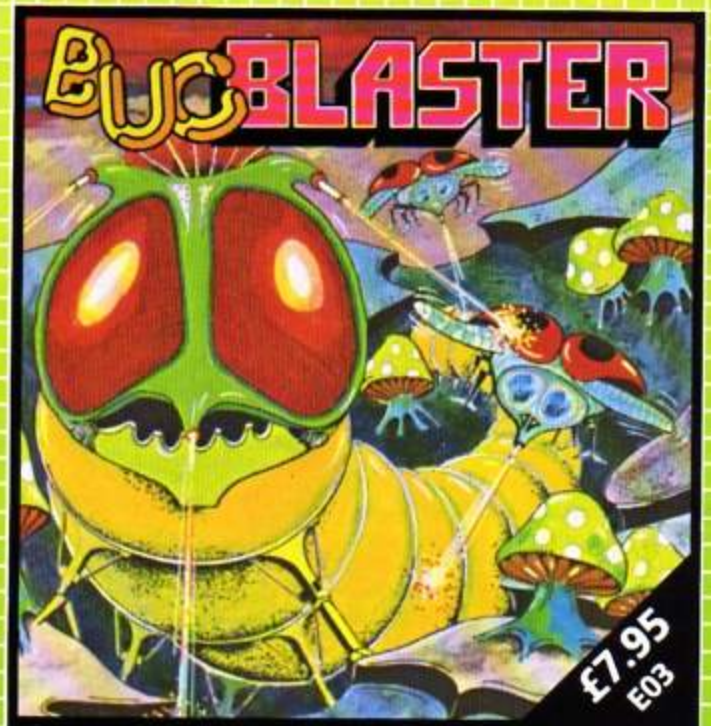

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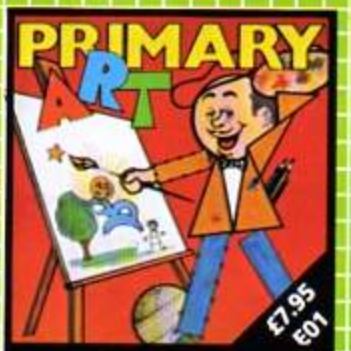

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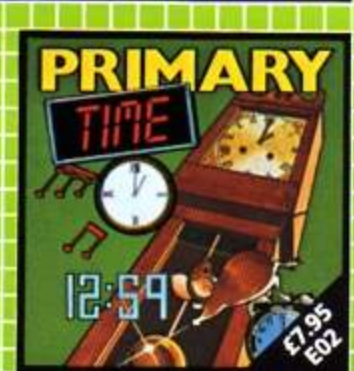

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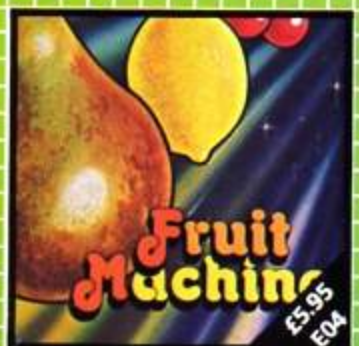

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. . . *'An excellent mixture of games'* . . .
Personal Software – Autumn 1983.

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. . . *'Very good indeed'* . . . A&B Computing – Jan/Feb 1984.

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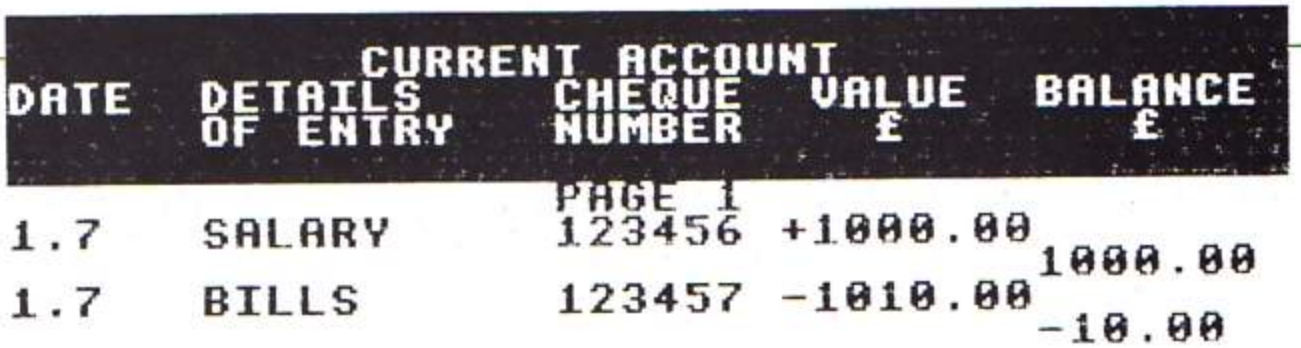


How to keep tabs on those cheques

By KEN SMITH

IN these days of ever increasing bank charges it pays to keep an accurate check on your cheque book. This program will help you do just that.

Bank Account is a simplified version of the spreadsheet programs written for much larger machines.

It allows you to keep tags on your account, update the balance, list all cheque entries together with their numbers and amend any account errors you may find.

After setting mode, error clearance and other instructions in lines 10 to 130, lines 140 and 150 dimension the various arrays used and set up all the variables for the main program.

Lines 160 to 280 contain the main program, successive procedures centred around the entry FOR... NEXT loop allowing 200 entries.

Listing starts on Page 44

VARIABLES

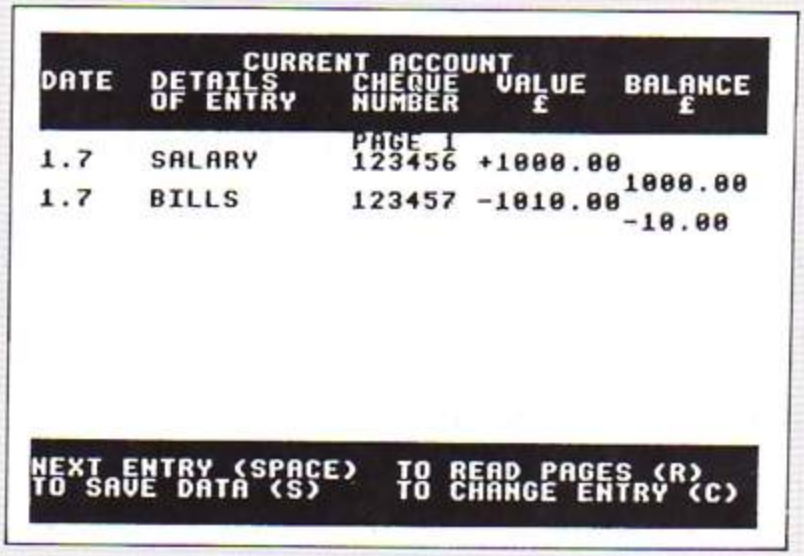
Y	The print coordinate.
D(0)	Balance value.
C(0)	Entry value.
A(0)	Debit or credit marker.
E	Entry marker used in FOR ... NEXT loop.
Q$	Cheque number/string.
w$	Date string.
E$	Details of entry string.
@%	Decimal place and field width pointer.

PROCEDURES

PROCheadings	Prints the page headings in the upper text window.
PROCfiles	Checks for the existence of a current datafile.
PROCinputbox	Defines the base text window where the input or messages will appear.
PROCentries	Uses the input box to collect data. Six pieces of information are required: entry details, cheque number, amount, credit or debit, and finally a Return to calculate the new balance.
PROCdisplay	Takes the information entered and displays it in the central text window.
PROCreadtape	Used to input a current datafile.
PROCkeepdata	Used for saving an updated or new account.
PROCstandingorders	Sets the function keys to act as multiple entry keys. The examples given in the program, MORTGAGE and RATE, are typical of the regular monthly outgoings. The one key entry will go through all the usual entry/input instructions in an instant. Lines 1210 and 1220 can be changed as desired. But beware – the layout of a standing orders entry is vital – spaces and all!
PROCreadpages	Allows you to check the previous account pages.
PROCcontinue	Halts the paging for you to check each page carefully.
PROCchange	Allows you to alter an entry. The computer will also adjust, using PROCadjust, all the balances from the altered entry if this is necessary.
PROCmessage	Informs you that you have reached the tenth and final page of the existing account and offers a choice of options.

From Page 43

```
 10 REM BANK ACCOUNT
 20 REM By Ken Smith
 30 REM Winscombe, Avon.
 40 REM (C) ELECTRON USER
 50 MODE 5
    :VDU 23,1,0;0;0;0;
 60 PRINT TAB(3,12)"BANK
     ACCOUNT"
 70 FOR I=1 TO 3000
    :NEXT
 80 PRINT TAB(3,16)"by
     Ken Smith"
 90 FOR I=1 TO 3000
    :NEXT
100 MODE 4
    :VDU 23,1,0;0;0;0;
110 *FX11,0
120 ON ERROR GOTO 170
130 *KEY10OLD|MRUN|M
140 DIM D(200),C(200)
    ,Q$(200),W$(200),E$(200
    ),A(200)
150 Y=1
    :D(0)=0
    :@%=&20206
    :C(0)=0
    :E=1
    :A(0)=0
    :B=0
160 REM *** MAIN PROGRAM
     ***
170 PROCstandingorders
180 PROCheadings
190 PROCfiles
200 N=E
210 FOR E=N TO 200
220 PROCinputbox
230 PROCentries
240 PROCdisplay
250 IF E>199
    THEN PROCcontinue
    :PROCmessage
260 IF E>199
    THEN D(0)=D(200)
270 NEXT
280 N=1
    :GOTO 210
290
300 DEF PROCheadings
310 VDU 28,0,4,39,0
320 COLOUR 129
    :CLS
    :COLOUR 0
330 PRINT TAB(11,1)"CURRENT
     ACCOUNT"
340 PRINT "DATE  DETAILS
     CHEQUE  VALUE
     BALANCE"
350 PRINT TAB(6);"OF ENTRY"
    ;TAB(17);"NUMBER";
    TAB(27);"£"TAB(35);
    "£"
360 ENDPROC
370
380 DEF PROCfiles
390 VDU 28,0,31,39,28
400 COLOUR 129
    :CLS
    :COLOUR 0
410 PRINT '"IS THERE A
     DATAFILE IN USE ?"
420 A$=GET$
    :SOUND 1,-15,87,2
    :CLS
430 IF A$="Y"
    THEN PROCreadtape
    :PROCreadpages
    :Y=K
    :ENDPROC
440 IF A$="N"
    THEN ENDPROC
    ELSE 410
450
460 DEF PROCinputbox
470 VDU 28,0,31,39,28
480 COLOUR 129
    :CLS
    :COLOUR 0
490 PRINT '"NEXT ENTRY
     (SPACE)"TAB(20);"TO
     READ PAGES (R)"
500 PRINT "TO SAVE DATA
     (S)"TAB(20);"TO CHANGE
     ENTRY (C)"
510 A$=GET$
    :SOUND 1,-15,87,2
    :CLS
520 IF A$=" "
    THEN ENDPROC
530 IF A$="C"
    THEN PROCchange
    :PROCinputbox
    :ENDPROC
540 IF A$="R"
    THEN PROCreadpages
    :PROCinputbox
    :ENDPROC
550 IF A$="S"
    THEN PROCkeepdata
    ELSE 490
560 PROCinputbox
    :ENDPROC
570
580 DEF PROCentries
590 CLS
600 PRINT '" DATE (Max
     5 figures) - then
     RETURN "
    :INPUT W$(E)
    :SOUND 1,-15,120,2
    :CLS
610 IF LEN (W$(E))>5
    THEN 600
620 PRINT '" ENTRY (Max
     10 letters) - then
     RETURN "
    :INPUT E$(E)
    :SOUND 1,-15,100,2
    :CLS
630 IF LEN (E$(E))>10
    THEN 620
640 PRINT '" CHEQUE NUMBER
     (Max 6 figures)"'
    " then RETURN ";
    :INPUT Q$(E)
    :SOUND 1,-15,128,2
    :CLS
650 IF LEN (Q$(E))>6
    THEN 640
660 PRINT '" AMOUNT - then
     RETURN "
    :INPUT C(E)
    :SOUND 1,-15,100,2
    :CLS
670 PRINT '" CREDIT (C)
     or DEBIT (D) ?"
680 IF W$(E)="" AND E$(E)=
    ""AND Q$(E)=""
    AND C(E)=0.00 AND B=0
    THEN GOTO 220
690 G$=GET$
    :SOUND 1,-15,52,2
700 IF G$="C"
    THEN D(E)=D(E-1)+C(E)
710 IF G$="C"
    THEN A(E)=1
    :GOTO 740
720 IF G$="D"
    THEN D(E)=D(E-1)-C(E)
    ELSE 690
730 IF G$="D"
    THEN A(E)=0
740 CLS
    :PRINT '"TO CALCULATE
     BALANCE PRESS RETURN"
    :A$=GET$
    :SOUND 1,-15,120,2
    :CLS
```

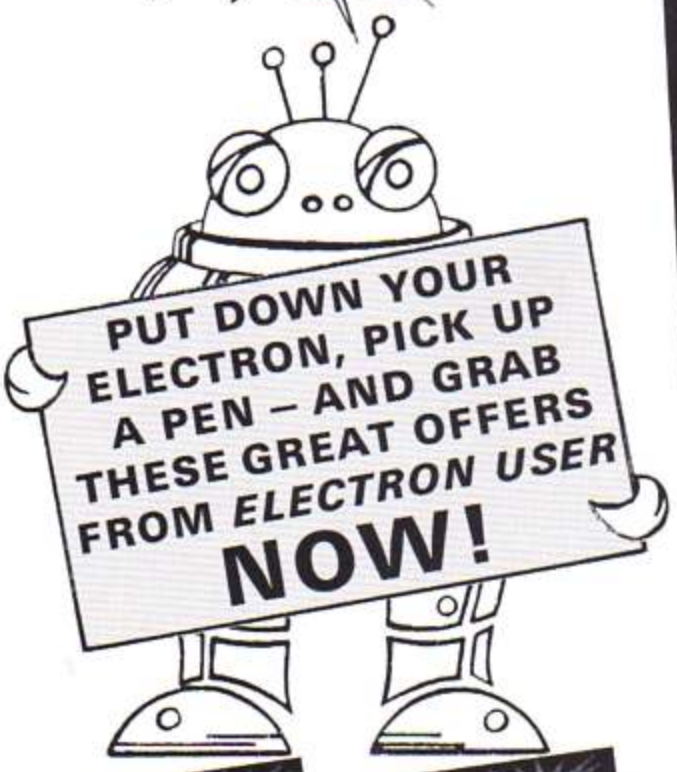


```
750 ENDPROC
760
770 DEF PROCdisplay
780 VDU 28,0,27,39,5
790 COLOUR 128
    :COLOUR 1
800 IF Y=1
    THEN CLS
810 @%=&00000
    :PRINT TAB(17,0)"PAGE
     ";((E-1) DIV 20)+1
    :@%=&20206
820 PRINT TAB(0,Y);W$(E);
    TAB(6);E$(E);TAB(17);D$
    (E);TAB(25);C(E)
830 IF A(E)=0
    THEN PRINT TAB(24
    ,Y);"-"
    ELSE PRINT TAB(24
    ,Y);"+"
840 IF C(E)>999 OR C(E)<-99
    9
    THEN Y=Y+1
850 PRINT TAB(32,Y);D(E)
860 IF C(E)>999 OR C(E)<-99
    9
    THEN E=E+1
    :D(E)=D(E-1)
    :C(E)=0.001
870 IF Y<20
    THEN Y=Y+1
    :ENDPROC
880 IF Y>19
    THEN Y=1
    :ENDPROC
890
900 DEF PROCreadtape
910 CLS
    :PRINT '"ALIGN DATAFILE
     TAPE."
920 PRINT "PRESS ANY KEY
     WHEN READY."
930 K$=GET$
940 *TAPE
950 X=OPENIN ("BANKDATA")
960 INPUT #X,E
970 FOR S=1 TO E
980 INPUT #X,W$(S),E$(S)
    ,D$(S),C(S),D(S),A(S)
990 NEXT
1000 CLOSE #X
1010 CLS
    :PRINT '" DATA LOADED."
    :SOUND 1,-15,87,10
1020 FOR I=1 TO 2500
    :NEXT
1030 ENDPROC
1040
1050 DEF PROCkeepdata
1060 CLS
    :PRINT '"ALIGN DATAFILE
     TAPE."
1070 PRINT "PRESS ANY KEY
     WHEN READY."
1080 K$=GET$
1090 *TAPE
1100 X=OPENOUT ("BANKDATA")
1110 PRINT #X,E
1120 FOR S=1 TO E
1130 PRINT #X,W$(S),E$(S)
    ,D$(S),C(S),D(S),A(S)
1140 NEXT
1150 CLOSE #X
1160 CLS
    :PRINT '" DATA SAVED."
    :SOUND 1,-15,87,10
1170 FOR I=1 TO 2500
    :NEXT
1180 ENDPROC
1190
1200 DEF PROCstandingorders
1210 *KEY1MORTGAGE!M !M
     150.00!M D!M !MINSURAN
    CE!M !M 20.00!M D!M
1220 *KEY2RATES!M !M 40.00!M
     D!M
1230 ENDPROC
1240
1250 DEF PROCreadpages
1260 V=E
    :V=1
    :K=1
1270 REPEAT
1280 VDU 28,0,31,39,28
1290 COLOUR 129
    :CLS
    :COLOUR 0
1300 PRINT '"TO READ ACCOUNT
     PAGES PRESS SPACE."'
    "TO CHANGE AN ENTRY
     PRESS (C)."
1310 A$=GET$
    :SOUND 1,-15,87,2
1320 IF A$="C"
    THEN PROCchange
    :GOTO 1300
1330 IF A$=" "
    THEN 1340
    ELSE 1300
1340 VDU 28,0,27,39,5
1350 COLOUR 128
    :CLS
    :COLOUR 1
1360 REPEAT
1370 IF K=1
    THEN CLS
1380 @%=&00000
    :PRINT TAB(17,0)"PAGE
     ";((V-2) DIV 20)+1
    :@%=&20206
1390 IF C(V)=0.001
    THEN GOTO 1440
1400 PRINT TAB(0,K);W$(V);
    TAB(6);E$(V);TAB(17);D$
    (V);TAB(25);C(V)
1410 IF A(V)=0
    THEN PRINT TAB(24
    ,K);"-"
    ELSE PRINT TAB(24
    ,K);"+"
1420 IF C(V)>999 OR C(V)<-99
    9
    THEN K=K+1
1430 PRINT TAB(32,K);D(V)
1440 K=K+1
    :V=V+1
1450 UNTIL K=20 OR V=E
1460 IF V=E
    THEN K=1
1470 UNTIL V=E
1480 ENDPROC
1490
1500 DEF PROCcontinue
1510 VDU 28,0,31,39,28
1520 COLOUR 129
    :CLS
    :COLOUR 0
1530 PRINT '"TO CONTINUE
     PRESS SPACE."
1540 A$=GET$
    :SOUND 1,-15,87,2
1550 IF A$=" "
    THEN ENDPROC
    ELSE 1540
1560
1570 DEF PROCchange
1580 VDU 28,0,31,39,28
1590 COLOUR 129
    :CLS
    :COLOUR 0
1600 PRINT '"WHICH ENTRY
     NUMBER - then RETURN
     ?"
1610 INPUT ;"(EACH PAGE
     HAS 20 LINES OF ENTRIE
    S)";H
    :SOUND 1,-15,87,2
1620 IF H<1 OR H>200
    OR H>E-1
    THEN 1590
1630 CLS
    :PRINT '" TO ENTER
     NEW DETAILS PRESS
     SPACE."
1640 A$=GET$
    :SOUND 1,-15,87,2
1650 M=E
    :E=H
    :B=1
1660 PROCentries
1670 E=M
    :B=0
1680 IF D(H)-C(H+1)<>D(H+1)
     OR D(H)+C(H+1)<>D(H+1)

    THEN PROCadjust
1690 M=1
    :ENDPROC
1700
1710 DEF PROCmessage
1720 VDU 28,0,27,39,6
1730 COLOUR 128
    :CLS
    :COLOUR 1
1740 PRINT TAB(0,4)"This
     is the final page
     available in"'"this
     account."'"If you
     wish to save this
     data please"'"press
     (S)."'"All data excep
    t the current balance"
    '"will be lost otherwis
    e."
1750 A$=GET$
    :SOUND 1,-15,87,2
1760 IF A$="S"
    THEN VDU 28,0,31,39
    ,28
    :PROCkeepdata
    :ENDPROC
1770 IF A$="C"
    THEN ENDPROC
    ELSE 1740
1780
1790 DEF PROCadjust
1800 FOR W=(H+1) TO E
1810 IF A(W)=0
    THEN D(W)=D(W-1)-C(W)
1820 IF A(W)=1
    THEN D(W)=D(W-1)+C(W)
1830 NEXT
1840 ENDPROC
```

This listing is included in this month's cassette tape offer. See order form on Page 34.

electron user



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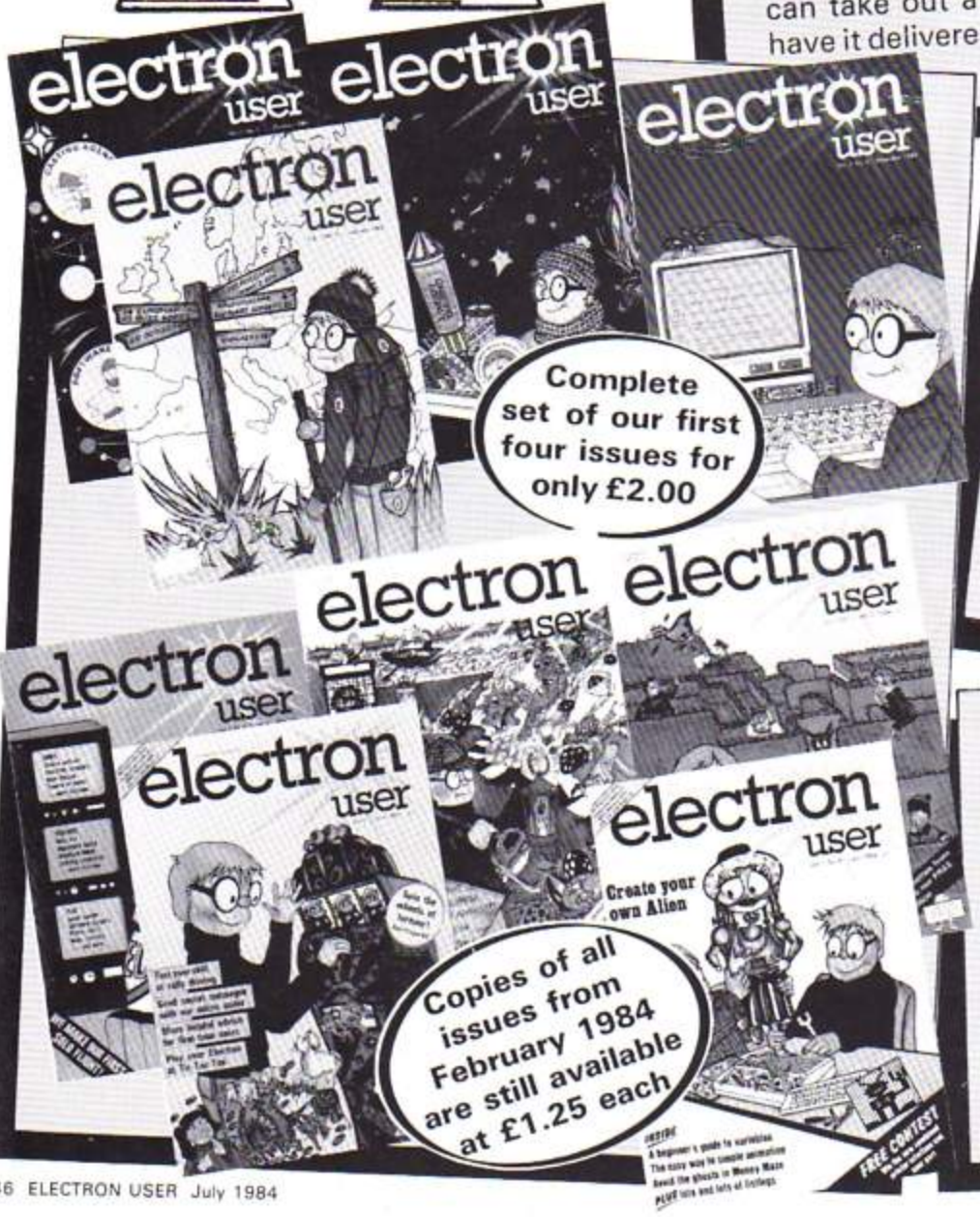

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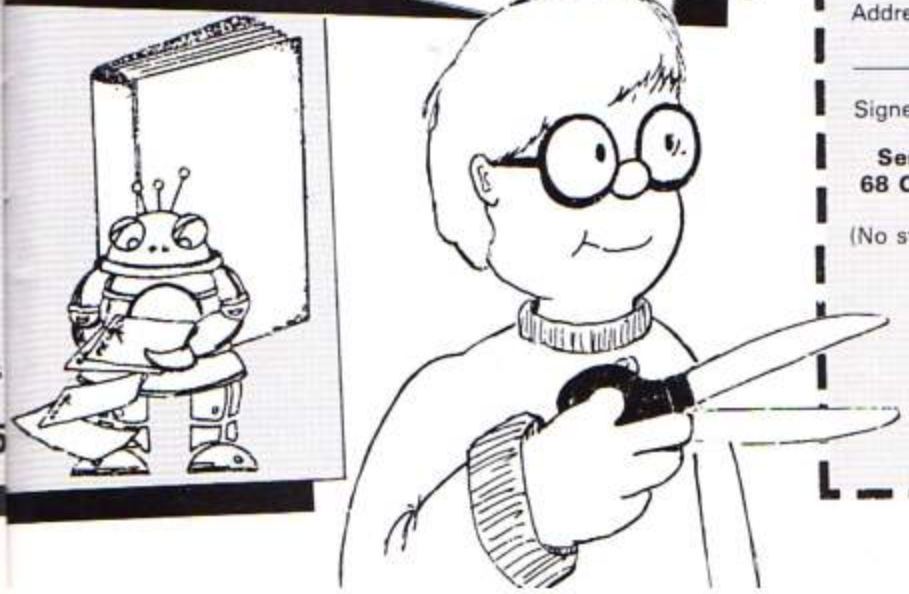

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EIRE £13 (IR £16) ☐
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Commence with _____ issue TOTAL _____

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£2.25 Overseas (Surface)
Complete set of 4 ☐
TOTAL _____

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March ☐
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May ☐
June ☐
Airmail prices on application
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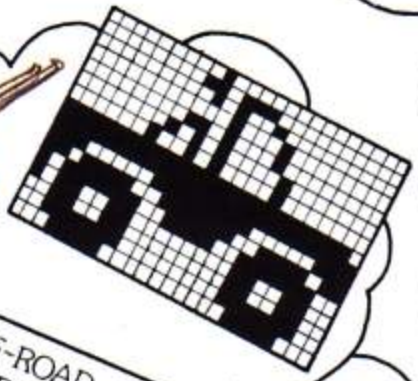
From Jason Owens, Batley, W. Yorkshire

```
VDU 23,225,127,113,117,
113,127,127,28,8
VDU 23,226,255,95,95,
79,255,255,3,1
VDU 23,227,48,72,72,
124,124,252,128,0
```

LOCO AND TENDER

From L. and B. Holgate, Deeping St. James

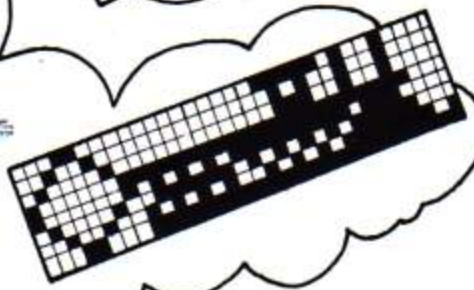
```
VDU 23,245,224,67,75,
255,255,255,113,32
VDU 23,246,0,192,0,95,
95,255,206,132
```



OFF-ROAD PICK-UP TRUCK

From K. Cawsey, Merseyside

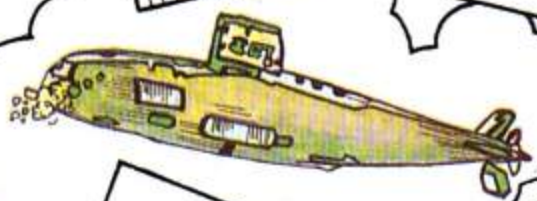
```
VDU 23,232,0,0,0,
0,0,1,2,255
VDU 23,233,64,220,82,
17,209,80,80,255
VDU 23,234,0,0,0,0,
0,128,128,254
VDU 23,235,255,224,222,
191,179,51,63,30
VDU 23,236,255,255,126,
60,0,0,0,0
VDU 23,237,255,7,123,252,
204,204,252,120
```



PADDLESTEAMER

From Toby Corbin, Southampton

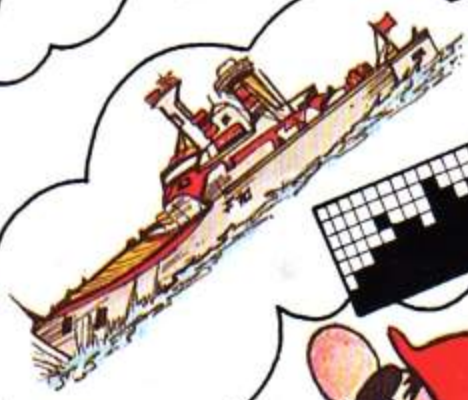
```
VDU 23,228,24,36,66,
129,129,66,36,24
VDU 23,229,0,0,0,255,
85,126,170,255
VDU 23,230,31,10,14,
255,255,170,85,255
VDU 23,231,80,80,80,
248,112,248,253,255
```

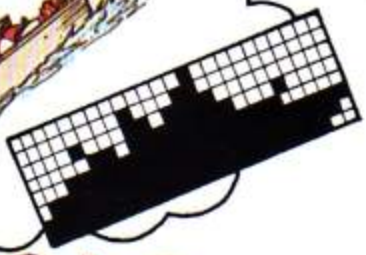


U-BOAT

From L. and B. Holgate, Deeping St. James

```
VDU 23,241,0,0,1,
95,61,95,0,0
VDU 23,242,192,128,
192,252,182,252,0,0
```





BATTLESHIP

From Stephen Ashworth, Dukinfield, Cheshire

```
VDU 23,238,0,0,8,6,31,
127,255,255
VDU 23,239,4,140,222,
255,255,255,255,255
VDU 23,240,0,0,0,16,
224,255,254,252
```

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Chart your progress – in 3D

CHARTIST is a short but very effective program from JON WILLINGTON of Hereford.

It processes information supplied by the user and displays a colourful three-dimensional bar chart.

When you run the program it asks you for the title of the graph and a label for the y axis.

Then you put in your figures for each of the 12 months of the year.

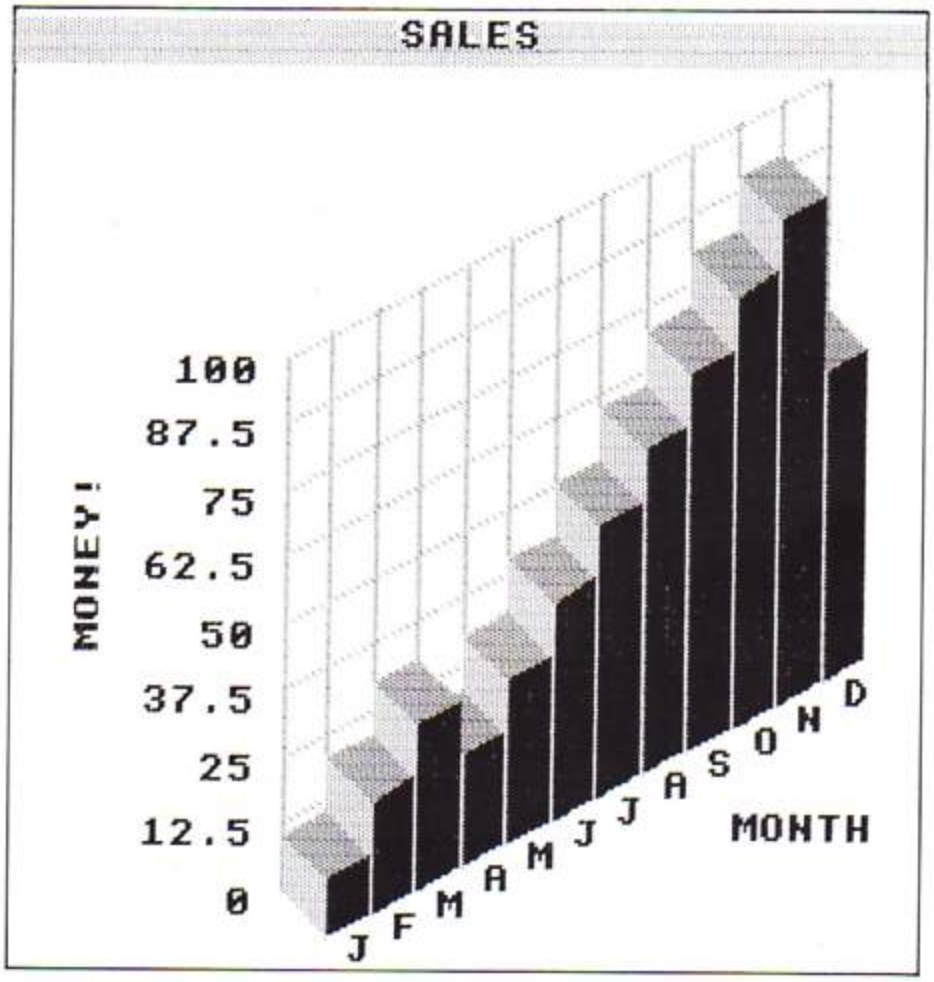
The Electron next prints out a 3D coloured bar chart, showing graphically what has happened over the year.

The program is constructed as shown on the right.

```
CHARTIST
TITLE OF GRAPH SALES
Y-AXIS LABEL  MONEY!
RANGE OF GRAPH: 0 TO 100
```

MONTH	VALUE
JANUARY	10
FEBRUARY	20
MARCH	30
APRIL	20
MAY	30
JUNE	40
JULY	50
AUGUST	60
SEPTEMBER	70
OCTOBER	80
NOVEMBER	90
DECEMBER	57

40	Sets mode to Mode 1
50	Calls input routines
60	Sets variables and colours
70-260	Draws and labels axes
270-290	Takes next piece of data to be drawn
300-330	Draws top of block
340-360	Draws front of block
370-400	Draws side of block
410-420	Tidies up graph and end program
430-490	Procedure to print a string sideways
500-740	Input procedure




```
 10 REM CHARTIST
 20 REM J.WILLINGTON
 30 REM (C) ELECTRON USER
 40 MODE 1
 50 PROCinputs
 60 MODE 1
    :VDU 20
 70 K=70
    :F%=300
    :VDU 19,3,4;0;
 80 X$="MONTH"
 90 PROCside(2,10,Y$)
100 COLOUR 2
    :PRINT TAB(25,27)X$
110 COLOUR 131
    :PRINT TAB(0,0)STRING$(80
    ,CHR$ 32)
120 VDU 5
    :V=640-(LEN A$*16)
130 GCOL 0,0
    :MOVE V,1015
    :PRINT A$
    :MOVE V+4,1011
    :PRINT A$
    :GCOL 0,2
    :MOVE V+8,1007
    :PRINT A$
140 SCALE=MAX/8
    :VDU 29,0;-25;
150 FOR R%=0 TO 8
    :GCOL 0,1
160 MOVE F%,R%*K+100
    :PLOT 17,600,300
170 GCOL 0,2
180 MOVE -50,R%*K+100
    :PRINT R%*SCALE
190 NEXT
200 RESTORE 260
210 FOR R%=0TO 12
    :GCOL 0,1
220 MOVE F%+R%*50,R%*25+100
230 PLOT 1,0,560
240 MOVE F%+R%*50+75,R%*25+50
250 GCOL 0,2
    :READ A$
    :PRINT A$
    :NEXT
260 DATA J,F,M,A,M,J,J,A
    ,S,O,N,D," "
270 FOR B%=12 TO 1 STEP -1
280 GCOL 0,1
    :P=Q(B%)
    :P=P/SCALE
290 IF P=0
    THEN NEXT
    :GOTO 270
300 MOVE F%+B%*50,P*K+B%*25+1
    00
```

```
310 MOVE F%+(B%-1)*50,P*K+(B%
    -1)*25+100
320 PLOT 85,F%+(B%+1)*50-4
    ,(P-1)*K+(B%+1)*25+100
330 PLOT 85,F%+B%*50,(P-1)*K+
    B%*25+100
340 GCOL 0,2
350 PLOT 85,F%+(B%+1)*50-4
    ,(B%+1)*25+25
360 PLOT 85,F%+B%*50,B%*25+25
370 GCOL 0,3
    :MOVE F%+B%*50,(P-1)*K+B%
    *25+100
380 PLOT 85,F%+(B%-1)*50
    ,P*K+(B%-1)*25+100
390 MOVE F%+B%*50,B%*25+25
    :PLOT 81,-50,50
400 NEXT
410 GCOL 0,1
    :MOVE F%,100
    :DRAW F%,600
420 VDU 4
    :VDU 23,1,0;0;0;0;
    :REPEAT
    : UNTIL FALSE
    :END
430 DEF PROCside(J%,K%,A$)
440 GCOL 0,2
    :PRINT TAB(0,0)A$
450 FOR A%=4TO LEN A$*32
    STEP 4
460 FOR B%=1023TO 995
    STEP -4
470 IF POINT(A%,B%)=3
    PLOT 69,J%*32+1023-B%
    ,K%*32+A%
480 NEXT
    :NEXT
490 ENDPROC
500 DEF PROCinputs
510 RESTORE 670
    :DIM Q(12)
520 VDU 19,0,4;0;
530 VDU 19,1,6;0;
540 COLOUR 129
    :VDU 19,2,15;0;
550 *FX10,50
560 FOR A=0 TO 2
570 PRINT TAB(1,A)STRING$(38
    ,CHR$ 32)
580 NEXT
590 COLOUR 0
    :PRINT TAB(16,1)"CHARTIST
    "
600 COLOUR 128
    :COLOUR 3
610 INPUT TAB(4,4)"TITLE
     OF GRAPH "A$
620 INPUT TAB(4,6)"Y-AXIS
     LABEL  "Y$
630 INPUT TAB(4,8)"RANGE
     OF GRAPH: 0 TO "MAX
640 PRINT TAB(8,11)"MONTH"
    SPC 10"VALUE"
650 MOVE 150,175
    :DRAW 150,700
    :DRAW 1100,700
    :DRAW 1100,175
    :DRAW 150,175
660 MOVE 150,625
    :DRAW 1100,625
    :MOVE 600,700
    :DRAW 600,175
670 DATA JANUARY,FEBRUARY
    ,MARCH,APRIL,MAY,JUNE
    ,JULY,AUGUST,SEPTEMBER
    ,OCTOBER,NOVEMBER,DECEMBER
680 PRINT
    :COLOUR 3
690 FOR A=1 TO 12
    :READ T$
700 PRINT TAB(6,A+12)T$
    :INPUT TAB(25,A+12)D
710 Q(A)=D
    :NEXT
    :COLOUR 2
    :COLOUR 129
720 PRINT TAB(8,29)"PRESS
     ANY KEY TO CHART"
730 G$=GET$
740 ENDPROC
```

This listing is included in this month's cassette tape offer. See order form on Page 34.

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If you enjoy the idea of creating your own user defined characters but are put off by the time consuming mathematics, then DESIGN is for you! DESIGN lets your imagination loose by letting you draw your characters, in all 16 colours, on an 8 x 8 grid leaving all the hard work to the machine. DESIGN's features include being able to recall multiple characters for re-editing and displaying VDU 23 commands. All characters used in KAY-ESS programs are created using DESIGN.

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After your SPACE TANK has landed on the planet Orion, a series of alien tanks, surface hoppers, and spacecrafts will attack. How long can you hold out commander? This game makes use of the Beeb's fast scrolling ability. Can be used with either keyboard or joysticks. Top ten table. Pause option.

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Come on now, don't be shy, choose one of the six horses and let's see what you can do. How many of the fences can you complete at the Orion arena, especially with the clock ticking away? New riders can try one of the more docile horses, while others may like to risk one of the more lively beasts! Can be used with either keyboard or joysticks. Top ten table. Pause option.

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Can you stop the STAR HAWKS before they stop you? Slow work means the generation of more laser firing mutant hawks. Based on the games of Galaxian and Gorf. Can be used with either keyboard or joysticks. Top eight table. Pause option.

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EARLY YEARS (B/E) For children between 3-6 years of age.
These two packages give an adult or older child a means to take a younger child through a series of simple game type tasks to enforce idea's. The emphasis is on learning through fun. Topics covered include subtraction, addition, recognition, colour, shapes, sizes, sounds/notes, co-ordination, distances, estimates, directions.

EARLY YEARS 1
A) MICKEY THE MONKEY and his apple tree make subtraction fun.
B) COLOUR BLOCKS bring sizes and colour into perspective.
C) MERRY MUSIC turns the keyboard into a musical keyboard.
D) FUNNY FACES presents a line up, which one is the suspect?
E) FRED THE FROG needs co-ordinated help to get across the pond.

EARLY YEARS 2
A) THE POND seems very active today.
B) SPEED is required to keep the cake on the conveyor belt.
C) DIRECTIONS seem to be needed by everyone in Orion village.
D) ORDER the blocks.
E) SID THE SPIDER needs some help to get out of the maze.

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Write your own 'Arcade Action' games with D.A.C.C.

Sprite-Gen

This amazing and revolutionary new piece of software, written for the BBC Model B by Dennis Ibbotson, represents the biggest step forward for BASIC programmers since the release of the BBC Micro itself. It allows you to create multi-coloured, fast moving SPRITES, controlled simply from your own BASIC program. Now you can write the kind of "Arcade Action" games you always dreamed of writing before you discovered that BASIC can't achieve the speeds necessary. Until now, only experienced machine-code programmers could produce "Ghost Gobbling Monsters" and "Light Speed" spacecraft. With SPRITE GRAPHICS all the creatures and objects you can imagine are at your command, moving smoothly at any speed and in any direction you choose. Incredibly, SPRITES can be created using ALL SIXTEEN logical colours – eight steady and eight flashing. And as if that were not enough you animate your SPRITES with individual movements such as "a man who walks", "a bird that flaps its wings", "invaders that pulse menacingly", the possibilities are endless! When you own the SPRITE GENERATOR package you have access to every sort of high-speed animation technique you need. Buying expensive machine-code games may become a thing of the past. Look at the following impressive list of features you can access from your own BASIC programs ...

- **Up to 32 SPRITES on screen at any time.**
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- **There can be up to EIGHT different SPRITE DESIGNS active at one time, each of which can have up to THREE "CLONES", (copies of the primary SPRITE but each with individual movement control).**
- **Each SPRITE actually has TWO images which given slight differences will achieve the animation effects when the two are alternated. Or, if you choose, give the two images totally different designs and you have created two SPRITES out of one, usable alternately. This technique can also be applied to the CLONES which means that all 32 SPRITES can be animated, multi-coloured, moving objects!!!**
- **Once you have completed the design of your SPRITES using the simple grid-based generator utility, they and the high speed machine-code routines that control their movement are secreted into RAM and the BASIC system is ready to accept your own program lines through which you can direct the SPRITES to appear, move, disappear or just remain stationary, with the simplest commands you could imagine.**
- **SPRITES can be linked together in pairs or groups to produce large scale animation. Of course, if you wish they can be as small as a single pixel.**
- **Your own creations can move in front of each other with no loss of detail.**

SPRITE-GEN is supplied as a package containing:

★★★ Sprite-Generator program
★★★ Two 'fast-action' demonstration programs
★★★ Sprite-Gen control routines
★★★ Illustrated user manual with examples and listings

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electron

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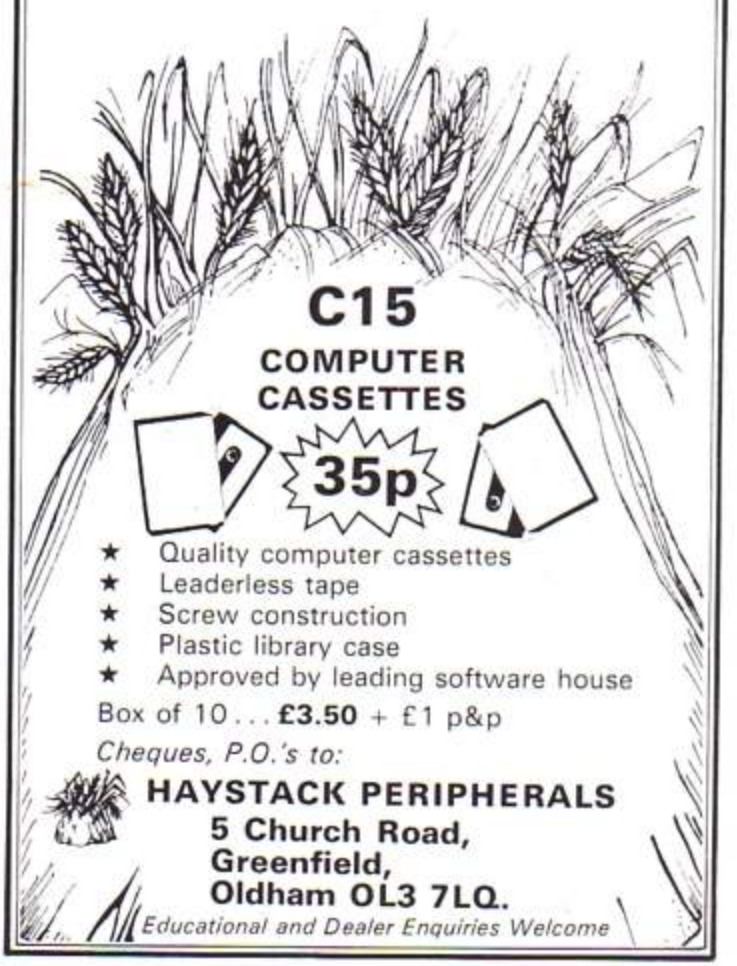
** Monsters is a trademark of Acornsoft.*



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Educational and Dealer Enquiries Welcome

Golf listing

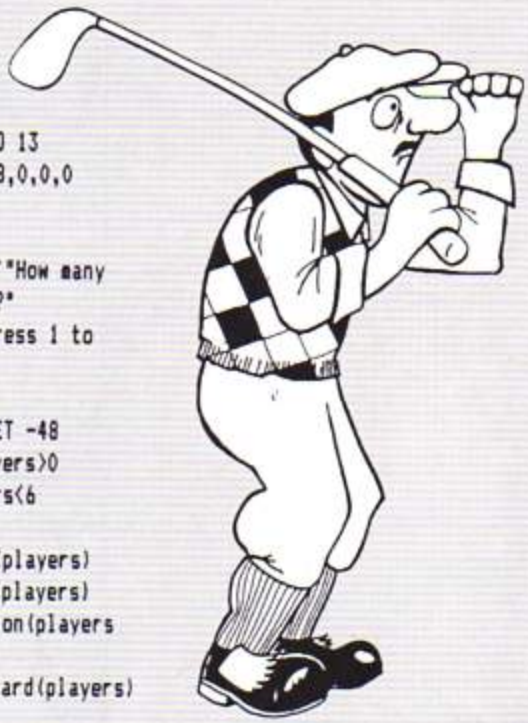
From Page 33

This listing was produced using a special formatter which breaks one program line over several lines of listing. When entering a line don't press Return until you come to the next line number. Full details of the formatter are given on Page 4 of the February issue.

```
400 NEXT i
410 ENDPROC
420
430 DEF PROCfairway
440 GCOL 0,3
450 j=832
460 MOVE 0,832
    : MOVE 0,650
470 FOR i=64 TO 1216
    STEP 64
480 j=j+RND(32)*(j>500)-
    RND(32)*(j<960)
490 PLOT 85,i,j
500 PLOT 85,i+32,j-160
510 NEXT i
520 ENDPROC
530
540 DEF PROCbunkers
550 VDU 5
560 GCOL 0,7
570 FOR i=1 TO 5
580 MOVE 200+RND(800)
    ,650+RND(200)
590 PRINT CHR$ 225
600 NEXT i
610 VDU 4
620 ENDPROC
630
640 DEF PROClake
650 VDU 5
660 GCOL 0,4
670 MOVE 200+RND(800)
    ,700+RND(200)
680 VDU 227,228,8,8,10
    ,229,230
690 VDU 4
700 ENDPROC
710
720 DEF PROCplay_hole
730 GCOL 3,8
740 x%=32
    : y%=800
750 FOR i=1 TO players
760 position(i,1)=x%
770 position(i,2)=y%
780 PLOT 69,x%,y%
790 holed(i)=FALSE
800 in_hazard(i)=FALSE
810 y%=y%-32
820 NEXT i
830 REPEAT
840 FOR n=1 TO players
850 IF NOT holed(n)
    THEN PROCshot
    : shots(n)=shots(n)+1
860 NEXT n
870 UNTIL FNall_holed
880 ENDPROC
890
900 DEF PROCshot
910 x%=position(n,1)
920 y%=position(n,2)
930 PRINT TAB(0,20);"Player
     ";n;"  Shots:";shots(n
    );SPC (180);
940 PROCinput_direction
950 PROCinput_distance
960 PROCcalculate_point
970 PROChit_ball
980 position(n,1)=x%
990 position(n,2)=y%
1000 ENDPROC
1010
1020 DEF PROCinput_direction
1030 REPEAT
1040 *FX21,0
1050 PRINT TAB(0,22);"Direct
     ion          "
1060 PRINT '"  1 2 3"''
     "  4 ";CHR$ 231;" 5"''
     "  6 7 8"
1070 INPUT TAB(10,22);direct
     ion%
1080 UNTIL direction%>0
      AND direction%<9
1090 PRINT TAB(11,22);direct
     ion%
1100 PRINT 'SPC (100)
1110 ENDPROC
1120
1130 DEF PROCinput_distance
1140 REPEAT
1150 *FX21,0
1160 PRINT TAB(0,24);"Distan
     ce          "
1170 PRINT '"(1 - 200)"
1180 INPUT ,TAB(10,24);dista
     nce%
1190 UNTIL distance%>0
      AND distance%<201
1200 PRINT 'SPC (9)
1210 distance%=2*distance%
1220 IF in_hazard(n)
     THEN distance%=
     RND(distance%)
     : in_hazard(n)=FALSE
1230 ENDPROC
1240
1250 DEF PROCcalculate_point
1260 ON direction% GOTO
     1270 ,1280 ,1290
     ,1300 ,1310 ,1320
     ,1330 ,1340
1270 nx%=x%-(2*distance%)
      DIV 3
     : ny%=y%+(2*distance%)
      DIV 3
     : ENDPROC
1280 ny%=y%+distance%
     : nx%=x%
     : ENDPROC
1290 nx%=x%+(2*distance%)
      DIV 3
     : ny%=y%+(2*distance%)
      DIV 3
     : ENDPROC
1300 nx%=x%-distance%
     : ny%=y%
     : ENDPROC
1310 nx%=x%+distance%
     : ny%=y%
     : ENDPROC
1320 nx%=x%-(2*distance%)
      DIV 3
     : ny%=y%-(2*distance%)
      DIV 3
     : ENDPROC
1330 ny%=y%-distance%
     : nx%=x%
     : ENDPROC
1340 nx%=x%+(2*distance%)
      DIV 3
     : ny%=y%-(2*distance%)
      DIV 3
     : ENDPROC
1350
1360 DEF PROChit_ball
1370 SOUND 0,-15,4,1
1380 PLOT 69,x%,y%
1390 GCOL 3,7
1400 DRAW nx%,ny%
1410 PROCpause(100)
1420 MOVE x%,y%
1430 DRAW nx%,ny%
1440 PROCcheck_position
1450 IF NOT lost_ball
     THEN x%=nx%
     : y%=ny%
1460 GCOL 3,8
1470 IF NOT holed(n)
     THEN PLOT 69,x%,y%
1480 ENDPROC
1490
1500 DEF PROCcheck_position
1510 COLOUR 6
1520 lost_ball=FALSE
1530 point=POINT(nx%,ny%)
1540 IF point=4
```

→

Golf listing

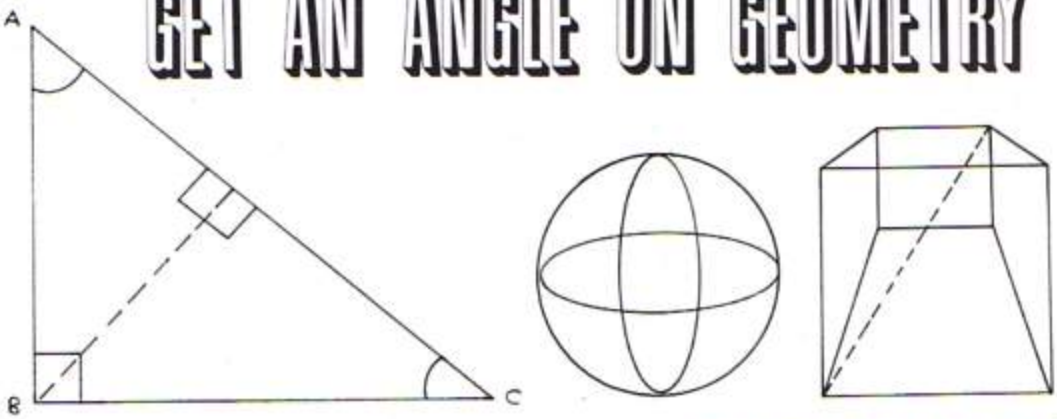


From Page 55

```
    THEN PRINT "Lost ball
     in lake !";
1550 IF point=2
    THEN PRINT "Ball in
     rough";
1560 IF point=7
    THEN PRINT "Ball in
     bunker";
1570 IF point=5
    THEN PRINT "Lost ball
     in tree !";
1580 IF point=0
    THEN holed(n)=TRUE
    : SOUND 1,1,100,20

    : PRINT "**  Well Done
      **";
    : PROCpause(500)
1590 IF point=-1 PRINT
    "Out of bounds !";
1600 IF point=4 OR point=5
     OR point=-1
    THEN SOUND 1,-15,0
    ,20
    : PROCpause(500)
    : lost_ball=TRUE
1610 IF point=2 OR point=7

    THEN SOUND 1,-15,20
    ,20
    : PROCpause(500)
    : in_hazard(n)=TRUE
1620 COLOUR 7
1630 ENDPROC
1640
1650 DEF FNall_holed
1660 number=0
1670 FOR i=1 TO players
1680 IF holed(i)
    THEN number=number+1
1690 NEXT i
1700 IF number=players

    THEN =TRUE
1710 IF number<players

    THEN =FALSE
1720
1730 DEF PROCset_variables
1740 VDU 19,6,9,0,0,0
1750 VDU 23,1,0;0;0;0;
1760 VDU 24,0;448;1279;992;
1770 FOR i=9 TO 13
1780 VDU 19,i,8,0,0,0
1790 NEXT i
1800 COLOUR 7
1810 PRINT '''"How many
      players ?"
1820 PRINT '"Press 1 to
      5"
1830 REPEAT
1840 players=GET -48
1850 UNTIL players>0
     AND players<6
1860 CLS
1870 DIM holed(players)
1880 DIM shots(players)
1890 DIM position(players
     ,2)
1900 DIM in_hazard(players)
1910 ENDPROC
1920
1930 DEF PROCpause(delay)
1940 TIME =0
1950 REPEAT
1960 UNTIL TIME >delay
1970 ENDPROC
1980
1990 DEF PROCinitialise
2000 VDU 23,224,32,96,224
     ,32,32,32,32,0
2010 VDU 23,225,24,62,127
     ,63,126,248,224,192
2020 VDU 23,226,0,0,0,0
     ,7,7,7,7
2030 VDU 23,227,24,62,127
     ,255,255,127,63,127
2040 VDU 23,228,12,30,191
     ,255,254,252,248,248
2050 VDU 23,229,255,255
     ,127,63,63,127,63
     ,31
2060 VDU 23,230,252,252
     ,254,254,252,240,192
     ,0
2070 VDU 23,231,146,84
     ,56,254,56,84,146
     ,0
2080 ENVELOPE 1,1,-1,0
     ,0,100,0,0,126,0,0
     ,-126,126,126
2090 *KEY10 "OLD !M RUN
     !M"
2100 *FX4,1
2110 *FX11,0
2120 *FX229,1
2130 ENDPROC
2140
2150 DEF PROCscores
2160 VDU 26
     : CLS
2170 COLOUR 6
2180 PRINT '''"SCORES"
2190 COLOUR 5
2200 PRINT "-------"
2210 PRINT '"After 9 holes..
     ."'
2220 COLOUR 3
2230 FOR n=1 TO players
2240 PRINT '"Player ";n;
     ": ";shots(n);" shots"
2250 NEXT n
2260 PRINT ''
2270 ENDPROC
2280
2290 DEF PROCgame_over
2300 *FX4,0
2310 *FX12,0
2320 *FX229,0
2330 VDU 23,1,1;0;0;0;
2340 ENDPROC
2350
2360 DEF PROCinstructions
2370 PRINT 'TAB(7);"GOLF"
2380 PRINT TAB(6);"------"'
2390 COLOUR 3
2400 PRINT '"Golf can be
     played"
2410 PRINT '"by up to 5
     players."''
2420 COLOUR 6
2430 PRINT '"Go round the
     9 hole"
2440 PRINT '"course using
     as few"
2450 PRINT '"strokes as
     possible."'
2460 COLOUR 5
2470 PRINT '"Avoid the bunke
     rs"
2480 PRINT '"and the rough,
     they"
2490 PRINT '"can be hard
     to get"
2500 PRINT '"out of."'
2510 COLOUR 2
2520 PRINT '"Press space...";
2530 SOUND 1,-15,100,5
2540 REPEAT
2550 UNTIL GET$ =" "
2560 CLS
     : COLOUR 7
2570 COLOUR 130
     : PRINT TAB(0,2);
     SPC (2);
     : COLOUR 128
     : PRINT " = rough"
2580 COLOUR 131
     : PRINT TAB(0,4);
     SPC (2);
     : COLOUR 128
     : PRINT " = fairway"
2590 COLOUR 4
     : PRINT TAB(0,6);

     : VDU 227,228,8,8
     ,10,229,230,11
     : COLOUR 7
     : PRINT " = lake"'
2600 VDU 225
     : PRINT "  = bunker"
2610 COLOUR 5
     : PRINT '"*";
     : COLOUR 7
     : PRINT "  = tree"
2620 COLOUR 8
     : PRINT '".";
     : COLOUR 7
     : PRINT "  = ball"
2630 SOUND 1,-15,100,5
2640 ENDPROC
```

This listing is included in this month's cassette tape offer. See order form on Page 34.

GET AN ANGLE ON GEOMETRY



FED up with figuring things out the hard way? Don't worry, RICHARD RENNIE's program Formulae will make things easy for you.

Want to know the volume of a sphere or the area of a triangle? Trying to get an angle on a cosine? It couldn't be simpler!

All you do is run Formulae, reply to the questions the Electron will ask and you'll be given the answer you want.

```
10 REM --VOLUME--AREA--TRIGO
   NOMETRY--
20 REM By Richard Rennie
30 REM (C)ELECTRON USER
40 MODE 2
50 COLOUR 6
   :PRINT TAB(1,5)"By Richar
   d Rennie"
60 VDU 23,1;0;0;0;0
70 COLOUR 2
   :PRINT TAB(9,8)"FOR"
80 PRINT TAB(3,10)"ELECTRON
    USER"
90 COLOUR 10
   :PRINT TAB(7,20)"VOLUME"
100 COLOUR 12
   :PRINT TAB(8,23)"AREA"
110 COLOUR 14
   :PRINT TAB(4,26)"TRIGONOM
   ETRY"
120 FOR T=1 TO 2000
130 NEXT T
140 CLS
150 MODE 6
160 PRINT TAB(0,3)"I'm not
     just good for games
     you know."''"I am also
     excellent at maths."
170 PRINT "Don't believe
     me? Then I'll prove
     it!"''"What would you
     like me to do?"
180 VDU 23,1;0;0;0;0
190 PRINT TAB(5,20)"--PRESS
    SPACE TO CONTINUE--"
200 WAIT$=GET$
210 CLS
220 PRINT
230 PRINT "VOLUME.....(p
   ress 1)"
240 PRINT "AREA.....(p
   ress 2)"
250 PRINT "TRIGONOMETRY....(p
   ress 3)"
260 INPUT Z
270 IF Z=1
   THEN PROCVOLUME
280 IF Z=2
   THEN PROCAREA
290 IF Z=3
   THEN PROCTRIG
300 IF Z<1 OR Z>3
   THEN GOTO 260
310 PRINT
320 PRINT "----------------
   ----------"
330 GOTO 230
340 DEF PROCVOLUME
350 PRINT "Do you want to
     find the volume of a
        PRISM, a CONE, a
     PYRAMID, a CYLINDER
     or a SPHERE"
360 INPUT V$
365 IF INSTR("PRISMCONEPYRAMI
   DCYLINDERSPHERE",V$)=0

   THEN GOTO 350
370 IF V$="PRISM" OR V$=
   "CYLINDER"
   THEN PROCPANDC
380 IF V$="CONE" OR V$="PYRAM
   ID"
   THEN PROCCANDP
390 IF V$="SPHERE"
   THEN PROCSPHERE
400 PRINT "The volume of
     the ";V$;" is ";X
410 ENDPROC
420 DEF PROCPANDC
430 PRINT "Please enter area
     of base"
    :INPUT Q
440 PRINT "Please enter heigh
   t"
    :INPUT W
450 X=Q*W
460 ENDPROC
470 DEF PROCCANDP
480 PRINT "Please enter area
     of base"
    :INPUT E
490 PRINT "Please enter heigh
   t"
    :INPUT R
500 X=(E/0.333)*R
510 ENDPROC
520 DEF PROCSPHERE
530 PRINT "Please enter radiu
   s"
   :INPUT Y
540 X=Y^3*3.14*(4/3)
550 ENDPROC
560 REM
570 DEF PROCAREA
579 REPEAT
580 PRINT "Do you want to
     find the area of a
        RECTANGLE(press
     1), a SQUARE(press 2),
     aTRIANGLE(press 3) or
     a CIRCLE(press 4)"
590 INPUT C
595 UNTIL C<5 AND C>0
600 IF C=1
   THEN PROCRECTANGLE
610 IF C=2
   THEN PROCSQUARE
620 IF C=3
   THEN PROCTRIANGLE
630 IF C=4
   THEN PROCCIRCLE
640 PRINT "That has an area
     of ";B
650 ENDPROC
660 DEF PROCRECTANGLE
670 PRINT "What is the length
   "
   :INPUT L
680 PRINT "What is the breadt
   h"
   :INPUT K
690 B=L*K
700 ENDPROC
710 DEF PROCSQUARE
720 PRINT "What is the length
   "
   :INPUT J
730 B=J*J
740 ENDPROC

750 DEF PROCTRIANGLE
760 PRINT "What is the length
     of the base"
   :INPUT H
770 PRINT "What is the height
   "
   :INPUT G
780 B=(H/2)*G
790 ENDPROC
800 DEF PROCCIRCLE
810 PRINT "What is the radius
   "
   :INPUT F
820 B=F*F*3.14
830 ENDPROC
840 REM
850 DEF PROCTRIG
860 PRINT "Do you want to
     find the SIN, COS or
     TAN of the angle"
870 INPUT D$
875 IF INSTR("SINCOSTAN"
   ,D$)=0
   THEN GOTO 860
880 PRINT "What is the angle
     you want to find the
      ";D$;" of"
890 INPUT P
900 IF D$="SIN"
   THEN PROCSIN
910 IF D$="COS"
   THEN PROCCOS
920 IF D$="TAN"
   THEN PROCTAN
930 PRINT "The ";D$;" of
     ";P " is ";O
940 ENDPROC
950 DEF PROCSIN
960 O=SIN (P/57.296)
970 ENDPROC
980 DEF PROCCOS
990 O=COS (P/57.296)
1000 ENDPROC
1010 DEF PROCTAN
1020 O=TAN (P/57.296)
1030 ENDPROC
```

This listing is included in this month's cassette tape offer. See order form on Page 34.

Solitaire listing

From Page 9

```
10 REM SOLITAIRE
20 REM BY R.CARTWRIGHT
30 REM (C) ELECTRON USER
40 ON ERROR PROCerror
50 MODE 5
   :VDU 23,1,0;0;0;0;
60 COLOUR 129
   :CLS
70 PRINT TAB(1,12);"DO YOU
    WANT TO SEE
                THE INSTRUC
   TIONS
                   (Y/N)"
80 IF GET$ ="Y"
   THEN CLS
   :PROCinst
90 PROCinit
   :CLS
100 PROCdisplay
   :TIME =0
110 REPEAT
120 VDU 4
130 PROCmove
140 UNTIL count=31
150 PROCfinish
160 PRINT TAB(3,20);"PRESS
    SPACE BAR"
   :PRINT
   :PRINT "  TO PLAY AGAIN "
170 IF GET =32
   THEN RUN
   ELSE END
180 END
190 DEF PROCdisplay
200 VDU 5
   :MOVE 600,970
   :PRINT ;"X"
   :MOVE 32,540
   :PRINT ;"Y"
210 GCOL 0,0
   :FOR I=814 TO 150
   STEP -96
220 MOVE 128,I
   :DRAW 1136,I
   :NEXT
230 FOR I=254 TO 1100
   STEP 128
240 MOVE I,150
   :DRAW I,900
   :NEXT
250 GCOL 0,3
   :VDU 5
   :CO=0
260 FOR I=222 TO 1100
   STEP 128
270 MOVE I,150
   :PRINT ;CO
280 MOVE I,920
   :PRINT ;CO
290 CO=CO+1
   :NEXT
300 CO=0
   :FOR I=830 TO 165
   STEP -96
310 MOVE 115,I
   :PRINT ;CO
320 MOVE 1136,I
   :PRINT ;CO
330 CO=CO+1
   :NEXT
   :GCOL 0,0
340 FOR I=864 TO 224
   STEP -96
350 FOR J=448 TO 768
   STEP 128
360 MOVE J,I
   :PROCdisc
370 NEXT
   :NEXT
380 FOR I=672 TO 416
   STEP -96
390 FOR J=192 TO 1024
   STEP 128
400 MOVE J,I
   :PROCdisc
410 NEXT
   :NEXT
420 MOVE 576,576
   :GCOL 0,3
   :PROCdisc
430 ENDPROC
440 DEF PROCmove
450 COLOUR 3
   :COLOUR 129
   :GO=1
460 PRINT TAB(1,30);"ENTER
    (X)"
   :X=(GET -48)*8+12
   :SOUND 1,1,90,3
   :PRINT TAB(1,30);"ENTER
    (Y)"
   :Y=(GET -48)*3+5
   :SOUND 1,1,90,3
470 PRINT TAB(1,30);SPC (10)
   :P=1
480 PROCcheck(X,Y)
490 IF GO=-1
   THEN SOUND 1,5,4,10
   :ENDPROC
500 VDU 5
   :GCOL 0,2
510 MOVE X*16,1024-(Y*32)
   :PROCdisc
520 VDU 4
   :GO=2
   :COLOUR 3
   :COLOUR 129
530 PRINT TAB(1,30);"L/R/U/D?
   "
   :DIR=GET
   :SOUND 1,1,90,6
540 PRINT TAB(1,30);SPC (10)
550 IF DIR=76
   THEN PROCml
560 IF DIR=82
   THEN PROCmr
570 IF DIR=85
   THEN PROCmu
580 IF DIR=68
   THEN PROCmd
590 IF GO=2
   THEN SOUND 1,5,4,10
   :GOTO 530
600 IF GO=-1
   THEN MOVE X*16,1024-(Y*32)
   :GCOL 0,0
   :VDU 5
   :PROCdisc
   :SOUND 1,5,4,10
   :ENDPROC
610 VDU 5
   :MOVE NX2*16,1024-(NY2*32)
620 GCOL 0,0
   :PROCdisc
630 MOVE NX*16,1024-(NY*32)
640 GCOL 0,3
   :PROCdisc
650 MOVE X*16,1024-(Y*32)
   :PROCdisc
   :count=count+1
660 ENDPROC
670 DEF PROCcheck(x,y)
680 GO=1
   :colour=POINT(x*16+64
   ,1024-(y*32))
690 IF colour<>0 AND P=1
   THEN GO=-1
700 IF colour<>3 AND P=2
   THEN GO=-1
710 ENDPROC
720 DEF PROCinit
730 VDU 23,224,3,15,63,127
   ,127,255,255,255
   : VDU 23,225,192,240
   ,252,254,254,255,255
   ,255
   :VDU 23,226,255,255
   ,255,255,255,255,255
   ,255
   :VDU 23,227,255,255
   ,255,127,127,63,15,3
   :VDU 23,228,255,255
   ,255,254,254,252,240
   ,192
   :VDU 19,2,15;0;
   :count=0
740 ENVELOPE 1,1,20,-20
   ,20,200,200,200,127
   ,127,127,127,127,127
750 SOUND 1,1,200,120
760 ENDPROC
770 DEF PROCdisc
780 VDU 224,225,10,8,8,226
   ,226,10,8,8,227,228
790 ENDPROC
800 DEF PROCml
810 NX=X-8
   :NY=Y
820 P=1
   :PROCcheck(NX,NY)
830 IF GO=-1
   THEN ENDPROC
840 NX2=NX-8
   :NY2=NY
850 P=2
   :PROCcheck(NX2,NY2)
860 ENDPROC
870 DEF PROCmr
880 NX=X+8
   :NY=Y
890 P=1
   :PROCcheck(NX,NY)
900 IF GO=-1
   THEN ENDPROC
910 NX2=NX+8
   :NY2=NY
920 P=2
   :PROCcheck(NX2,NY2)
930 ENDPROC
940 DEF PROCmu
950 NX=X
   :NY=Y-3
960 P=1
   :PROCcheck(NX,NY)
970 IF GO=-1
   THEN ENDPROC
980 NX2=NX
   :NY2=NY-3
990 P=2
   :PROCcheck(NX2,NY2)
1000 ENDPROC
1010 DEF PROCmd
1020 NX=X
   :NY=Y+3
1030 P=1
   :PROCcheck(NX,NY)
1040 IF GO=-1
   THEN ENDPROC
1050 NX2=NX
   :NY2=NY+3
1060 P=2
   :PROCcheck(NX2,NY2)
1070 ENDPROC
1080 DEF PROCfinish
1090 VDU 4
   :COLOUR 129
   :COLOUR 3
   :CLS
```

```
1100 IF count=31
     THEN PROCsuccess
     :ENDPROC
1110 PRINT TAB(1,10);"YOU
      DIDN'T FINISH"
     :PRINT
     :PRINT " THE GAME BUT
      YOU"
     :PRINT
     :PRINT " REMOVED ";count;
     " COUNTERS"
     :PRINT
     :PRINT " IN ";TIME
     DIV 6000;"mins ";
     TIME MOD 6000 DIV 100;
     "secs"
1120 ENDPROC
1130 DEF PROCsuccess
1140 PRINT TAB(2,5);"CONGRATUL
     ATIONS!"
1150 PRINT TAB(2,8);"YOU SUCCE
     SSFULLY"
     :PRINT
     :PRINT "  COMPLETED THE"
     :PRINT
     :PRINT "  GAME IN"
     :PRINT
     :PRINT ;"  ";TIME
     DIV 6000;"mins ";
     TIME MOD 6000 DIV 100;
     "secs"
1160 ENDPROC
1170 DEF PROCinst
1180 PRINT TAB(5,2);"SOLITAIRE
                  ---------"
1190 PRINT SPC (20)
1200 PRINT " THE OBJECT OF
      THE"
     :PRINT " GAME IS TO REMOV
     E"
     :PRINT " ALL BUT ONE
      OF THE"
     :PRINT " BLACK COUNTERS."
     :PRINT " THIS IS DONE
      BY"
     :PRINT " HOPPING OVER
      THEM"
1210 PRINT " INTO A SPACE.THE"
     :PRINT " PIECE JUMPED
      IS"
     :PRINT " THEN REMOVED."
1220 PRINT
1230 PRINT " TO MOVE A COUNTER
     "
     :PRINT " YOU FIRST ENTER"
     :PRINT " IT'S COORDINATES
     "
     :PRINT " (X) THEN (Y)."
     :PRINT " YOU ARE THEN
      GIVEN"
1240 PRINT " THE OPTION OF"
     :PRINT " MOVING IT LEFT,"
     :PRINT " RIGHT,UP OR
      DOWN"
     :PRINT " THE COMPUTER
      DOES"
     :PRINT " THE REST."
1250 PRINT TAB(3,30);"PRESS
      ANY KEY"
     :WAIT=GET
     :CLS
1260 PRINT TAB(0,3);" IF YOU
      ENTER AN "
     :PRINT " INCORRECT MOVE
      YOU"
     :PRINT " WILL BE MADE TO"
     :PRINT " ENTER IT AGAIN."
1270 PRINT
     :PRINT " IF AT ANY TIME"
     :PRINT " YOU REACH A
      POINT"
     :PRINT " WHEN YOU CAN'T"
     :PRINT " MOVE,PRESS (ESCA
     PE)"
1280 PRINT " YOUR GAME WILL
      NOW"
     :PRINT " BE ASSESSED"
     :PRINT TAB(3,30);"PRESS
      ANY KEY"
1290 WAIT=GET
1300 ENDPROC
1310 DEF PROCerror
1320 IF ERR =17
     THEN 150
     ELSE REPORT
     :PRINT " at line ";
     ERL
     :FOR I=1 TO 1000
     :NEXT
     :ENDPROC
```

This listing is included in this month's cassette tape offer. See order form on Page 34.

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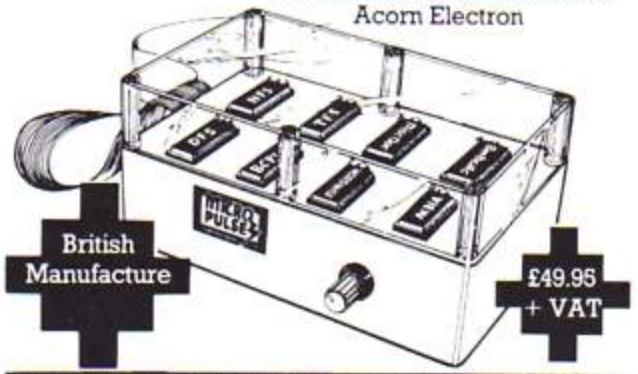

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Micro Messages

Day my Electron went on the air

ONE day, while Beethoven was turning in his grave at my rendition of Fur Elise on my Electron – hampered by having mislaid the manual at the time – I went upstairs to have another root around.

Suddenly I became aware that the dulcet tones of my micro were being broadcast through my radio!

Much surprised I tuned it in and discovered it on several frequencies, the strongest being about 95 VHF.

Now I am aware that computers can cause interference but have never met this before. – **T. Skinner, Caversham, Reading.**

● We haven't come across this either. You're right in thinking that micros can cause interference but this is the first time we've heard of it actually broadcasting! Has any Electron user out there had any similar experiences or got an explanation?

Heads you win

I KNOW that this program is very simple but I am only 10 and I don't know too much about computers.

It's a program where the computer tosses a coin and, depending which side the coin comes down, it prints heads or tails. When either heads or tails reaches 100 the Electron stops and prints out who won. – **Helen Jones, Cheadle Hulme, Cheshire.**

```
10 REM COINS
20 REM by Helen Jones
30 REM age 10.5
40 MODE 1
50 LET H=0
60 LET T=0
70 LET A=RND(2)-1
80 IF A=0
   THEN GOTO 150
90 COLOUR 1
100 PRINT "HEADS"
110 PRINT TAB(10)H;" HEADS!"
   :SOUND 1,-15,80,3
120 LET H=H+1
130 IF H=100
   THEN GOTO 290
140 GOTO 70
150 COLOUR 2
160 PRINT "TAILS"
170 LET T=T+1
180 PRINT TAB(5)T;" TAILS!"
   :SOUND 1,-15,100,3
190 IF T=100
   THEN GOTO 210
200 GOTO 70
210 G=GET
220 CLS
230 PRINT
240 PRINT "TAILS HAS WON"
   : SOUND 1,-15,RND(250)
   ,40
250 PRINT "DO YOU WANT
   ANOTHE R GO?"
260 INPUT A$
270 IF A$="YES" OR A$="Y"
   THEN GOTO 40
280 GOTO 330
290 G=GET
300 CLS
310 PRINT
320 PRINT "HEADS HAS WON!"
   :SOUND 1,-15,RND(250)
   ,40
330 CLS
340 PRINT
350 PRINT "GOODBYE"
360 END
370 INPUT "DO YOU WANT
   ANOTHER GO?"
380 IF B$="YES" OR B$="Y"
   THEN GOTO 40
390 CLS
400 PRINT
410 PRINT "GOODBYE"
420 END
```

● Thanks for the program, Helen. Not bad for ten years old. Here at *Electron User* we're wondering what your programming will be like at the ripe old age of 13.

Petal patterns

READERS may enjoy this short program which produces patterns. Values of ***N*** *in the range 2 to 10 give petals. Larger values like 50 give star patterns.*

For small values of ***N*** *it is interesting to compare the number of petals with* ***N****, noting the difference between odd and even values.*

```
10 REM ROSE PETAL CURVES
20 REM by R.M.JONES
30 MODE 1
   :GCOL 0,2
   :GCOL 0,129
40 VDU 23,1,0;0;0;0;
50 MOVE 640,512
60 PRINT " INPUT N"
70 INPUT N
80 CLG
90 FOR A=0 TO 192
100 B=A*PI /96
110 DRAW 640+500*COS B*
   SIN (N*B),512+500*
   SIN B*SIN (N*B)
120 NEXT
130 END
```

For a more colourful result add:

```
 30 MODE 2
    :C=1
    :D=1
105 IF A=(96*D)DIV N
    THEN C=C+1
    :D=D+1
106 IF C=8
    THEN C=9
107 IF C=15
    THEN C=1
108 GCOL 0,C
```

– **R.M. Jones, Cheadle Hulme, Cheshire.**

● An interesting little listing, Mr Jones. We notice that you share the same address as Helen – of the heads and tails program. Programs must RUN in the family!

Switched coordinates

IN the sixth paragraph of May's Program Probe, Nigel Peters says that to create a graphics window, VDU24 must be followed by the coordinates of the bottom left corner and then by those of the top left corner.

Shouldn't the second set of coordinates be the top right-hand corner? – **Christopher Jones, Cheadle Hulme.**

● Quite right, Christopher. As it is, we have Nigel Peters walking round with a big red bow on his right wrist so he'll remember. Incidentally, you're not another of the Jones tribe are you?

***WHAT would you like to see in future issues of* Electron User?**

What tips have you picked up that could help other readers?

Now's here is your opportunity to share your experiences.

Remember that these are the pages that you write yourselves. So tear yourself away from your Electron keyboard and drop us a line.

The address is:
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Micro Messages

Handling that cursor

I HAVE noticed that some programs listed in Electron User have turned off the flashing cursor by different methods. One is using:

```
VDU23;8202;0;0;0;
```

the other being:

```
VDU23,1,0;0;0;0;
```

Can you please explain the difference? Also, having turned it off, how do you turn it on to enable the program to be edited? – **Trevor Harley, Winchester.**

● There is no practical difference between the two ways of switching the cursor off. The one with 8202 is just a left over from the early days of the BBC Micro. The Electron accepts it for the sake of compatibility.

To switch the cursor back on just use:

```
VDU 23,1,1;0;0;0;
```

or, in the case of the 8202, just change mode.

Triangular technique

AFTER reading the Eddietorial in the March Electron User, I decided to try my hand at writing a small display program on my Electron. After a while I came up with the following eight line program which fills the screen with colourful triangles.

It uses the PLOT 85 command to draw a triangle on the screen.

The colour of the triangle is determined with GCOL 3,RND(16) which passes each bit of the random number through an exclusive OR gate with the bit pattern of the current background colour.

Although the RND function doesn't contain 0, black is included in the random selection because the Electron defaults 16 down to 0, giving black. – **Stephen Harrop, Cardiff.**

```
10 REM COLOURFUL SCREEN
15 REM by Stephen Harrop
20 MODE 2
30 REPEAT
40 X=RND(1279)
50 Y=RND(1023)
60 GCOL 3,RND(16)
70 PLOT 85,X,Y
80 UNTIL FALSE
```

● Thanks for the program Stephen, it's nice to know that our editorials can inspire someone. Or is it just that you prefer programming to reading them?

Optional grids

WE GOT our Electron at Christmas and have found it very entertaining, but a great time waster.

I enjoyed Mike Cook's "Quick on the Draw" program from the May issue of Electron User. Although not fully understanding the intricacies of the original, I have added a few extra lines of my own which give two optional grids.

They can be obtained as follows:

X– *gives an orthographic grid which helps accurately position lines and polygons.*

I– *gives an isometric grid which helps draw perspective shapes.*

I have found that the best effect is obtained when white or green shapes are shown on a red grid, but from the program the option is yours.

In order to get a really universal program, I tried to incorporate a method of colouring in shapes but without success. Has anyone else managed to do it? If so, I would be interested.

The listing shows the lines that have to be added to the original program to produce the grids. – **Pete Casebeto, Worthing, Sussex.**

```
 255 IF A$="I"
     THEN PROCISOGRID
 256 IF A$="X"
     THEN PROCORTHOGRID
2061 PRINT "I-DRAW ISOMETRIC
      GRID"
2062 PRINT "X-DRAW ORTHO
     GRAPHIC GRID"
2500 DEF PROCISOGRID
2510 FOR X=30 TO 1260
     STEP 150
2520 MOVE X,0
2530 PLOT 21,X,1020
2540 NEXT X
2550 FOR Y=-400 TO 1020
     STEP 96
2560 MOVE 0,Y
2570 PLOT 21,1260,Y+400
2580 NEXT Y
2590 FOR Y=0 TO 1500 STEP 96
2600 MOVE 0,Y
2610 PLOT 21,1260,Y-400
2620 NEXT Y
2630 ENDPROC
3000 DEF PROCORTHOGRID
3010 FOR X=0 TO 1260 STEP 100
3020 MOVE X,0
3030 PLOT 21,X,1020
3040 NEXT X
3050 FOR Y=0 TO 1020 STEP 100
3060 MOVE 0,Y
3070 PLOT 21,1260,Y
3080 NEXT Y
3090 MOVE 0,0
3100 ENDPROC
```

● Many thanks, Pete. It's nice to hear of people who adapt and improve our programs. We haven't come across a method of colouring in shapes but no doubt, one of our readers will let us know.

Real killer

AFTER reading about the score of 106,300 on Killer Gorilla in the May issue of Electron User, I have written in to see if 116,800 is a record. – **Robin Burnage, Holywell, Clwyd.**

● We don't know if it's a record, but it's certainly a good score and we admire your dedication.

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